DIV. OF FISHES

COMMERCIAL FISHERIES REVIEW

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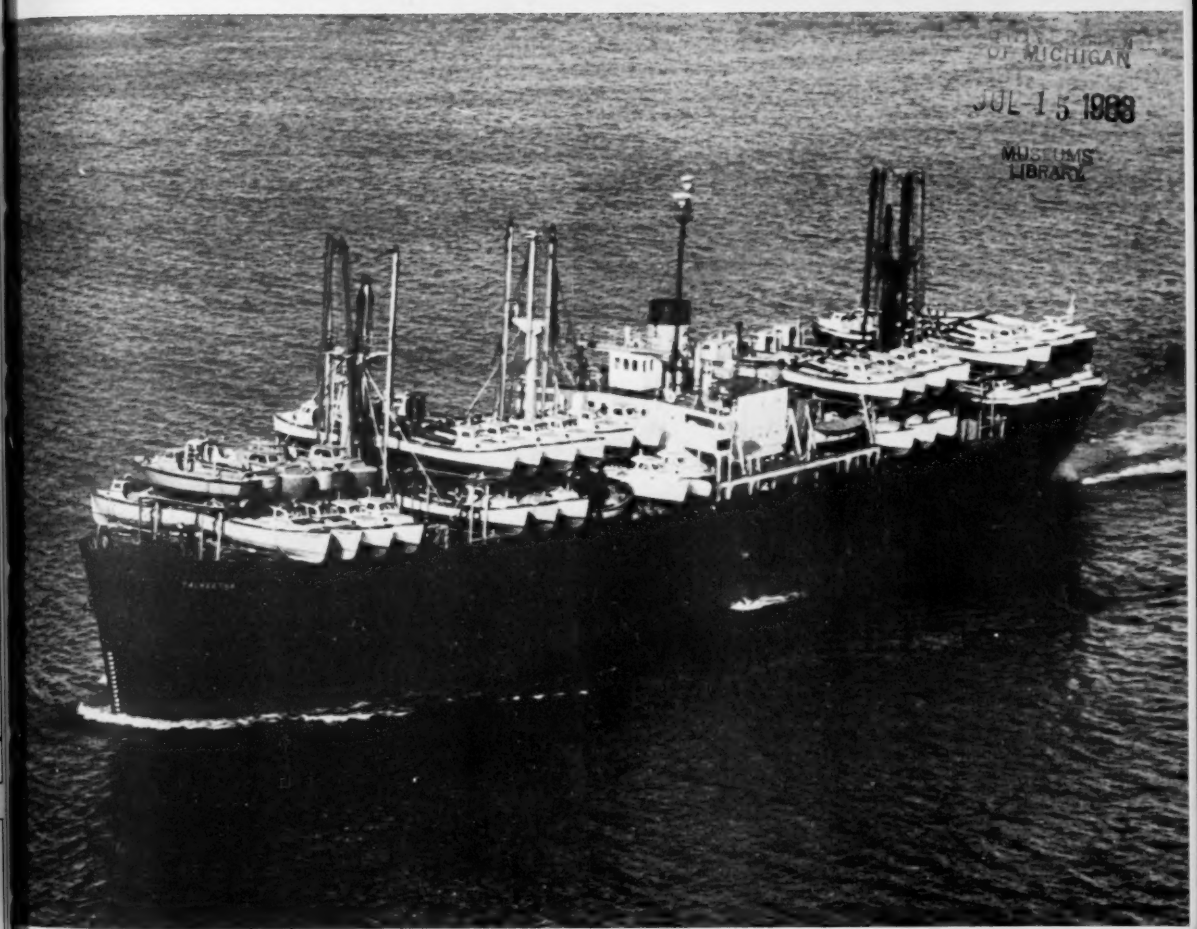

VOL. 25, NO. 5 MAY 1963

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Bureau of Commercial Fisheries
Washington, D.C.

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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

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5/31/63

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COMPARISON OF SALMON CATCHES IN MONOFILAMENT AND MULTIFILAMENT GILL NETS

By Herbert A. Larkins*

ABSTRACT

An experiment designed to compare the salmon catches of monofilament and multifilament gill nets was conducted in 1962 by the U. S. Bureau of Commercial Fisheries on board the research vessel Bertha Ann. Monofilament gill nets of $3\frac{1}{4}$-inch and $4\frac{1}{2}$-inch mesh were inserted in the normal multifilament net string and the catches of the two types were analysed in terms of number of fish, length, age, and species composition. The effect of monofilament nets on adjacent multifilament nets was also tested.

In general, the monofilament greatly outfished the multifilament and took the same lengths and ages of salmon as the multifilament although the species composition differed. The presence of monofilament apparently reduced the salmon catch of adjacent $3\frac{1}{4}$-inch multifilament nets.

INTRODUCTION

Since the beginning of the commercial use of monofilament nets in the North Pacific Ocean during the late 1950's, the popular fisheries news media have reported the apparent superiority of the clear, almost transparent filament over the conventional multifilament nylon twine (Pacific Fisherman, Sept. 1961, p. 29). The efficiency of the monofilament gill nets appeared so great that the states of Oregon, Washington, Alaska, and the Province of British Columbia have prohibited their use in the coastal salmon fisheries. The Japanese, who pioneered the use of monofilament in the North Pacific Ocean, are increasing the use of it in their high seas salmon fishery with considerable success (Pacific Fisherman, Sept. 1961, p. 62 and Nov. 1961, p. 14).

The Bureau of Commercial Fisheries, under the auspices of the International North Pacific Fisheries Commission, has since 1955, been conducting a continuing high seas salmon research program. One phase of this program has been a surface gill net sampling project in the North Pacific Ocean, Bering Sea, and Gulf of Alaska. To provide sufficient numbers of red (Oncorhynchus nerka), chum (O. keta), and pink (O. gorbuscha) salmon for meristic and scale studies, the amount of nylon multifilament gear used per set has been increased from 600 fathoms in 1955 to 2,000 fathoms in 1960 and 1961.

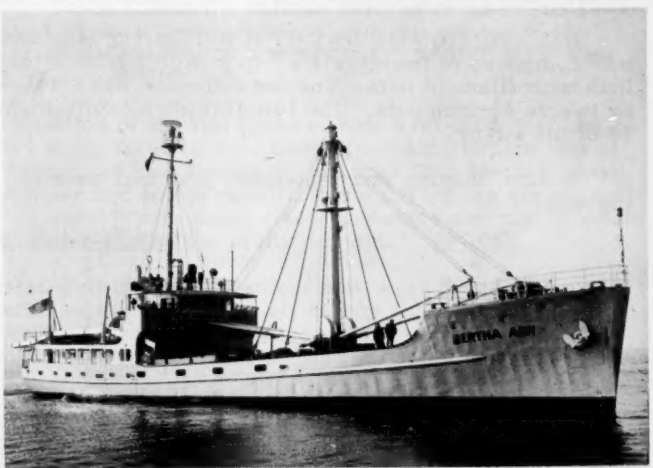

Fig. 1 - The Bureau of Commercial Fisheries chartered research vessel M/V Bertha Ann.

Because of the length of the present net string (two nautical miles), the

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cost of providing the nets and spares for a single string, plus the expense of handling and maintenance, has become great. Loss of gear due to bad weather, whales, shipping, etc., has also increased with the longer string.

Therefore, the promise of a more efficient type of sampling gear, the monofilament gill net, was welcomed in that it could possibly provide the necessary numbers of salmon with a saving of time, effort, and money through use of a shorter net string.

In view of the continuing aspects of our research work and the need for data that is comparable from year to year, a careful evaluation of the monofilament netting was necessary before it could be incorporated into our sampling scheme.

During the 1962 field season, monofilament gill nets were included in the net string of the Bureau's chartered research vessel M/V Bertha Ann (fig. 1). An experiment was designed to investigate the selective properties of monofilament nets in terms of age composition, species composition, and length composition of its catches as well as the comparative efficiency of monofilament in taking salmon. Furthermore, the design permitted an analysis of the effect the presence of monofilament nets might have on adjacent multifilament nets.

In general, the objective of this study was to determine if monofilament gill nets would take consistently larger samples than multifilament nets with resulting reduction in cost, time, and effort in handling and maintaining the net string.

METHODS AND MATERIALS

DESCRIPTION OF NETS: The multifilament nets, used exclusively in the past, were made of type 330 nylon. The mesh sizes (stretched measure) used in 1962 were $2\frac{1}{2}$-, $3\frac{1}{4}$-, $4\frac{1}{2}$-, and $5\frac{1}{4}$-inch. The webbing, dyed green, was hung in 50 percent on the cork and lead lines (100 fathoms of web hung on 50 fathoms of cork and lead line) and was four fathoms deep. The individual nets were tied together at the cork and lead lines and the webbing of adjacent nets was laced together to form a continuous string. See Powell and Peterson (1957) and Hanavan and Tanonaka (1959) for a complete description of high seas salmon gill nets.

The monofilament netting was of German-manufactured Perlon. The experimental nets used in 1962 were of $3\frac{1}{4}$- and $4\frac{1}{2}$-inch mesh size. The filament in the $3\frac{1}{4}$- and $4\frac{1}{2}$-inch mesh size nets was 0.5 and 0.6 mm. in diameter, respectively. The monofilament nets were dyed a very light blue-grey and hung identically with the multifilament nets.

DESCRIPTION OF NET STRING: During May and June (spring season), the net string was composed of twenty-six $4\frac{1}{2}$-inch multifilament, eight $5\frac{1}{4}$-inch multifilament, and two $4\frac{1}{2}$-inch monofilament nets. The net sequence was: $4\frac{1}{2}$"-$4\frac{1}{2}$"-$5\frac{1}{4}$" repeated eight times, followed by twelve $4\frac{1}{2}$-inch nets. The two $4\frac{1}{2}$-inch monofilament nets were inserted in positions 5 and 23 of the string.

In July, August, and September (summer season), the string was composed of the following nets:

Number	Mesh Size (Inches)	Type
4	$2\frac{1}{2}$	Multifilament
7 or 8	$3\frac{1}{4}$	"
15 or 16	$4\frac{1}{2}$	"
4	$5\frac{1}{4}$	"
1 or 2	$3\frac{1}{4}$	Monofilament
1 or 2	$4\frac{1}{2}$	"

The string was designed to allow the use of a basic portion of multifilament nets to collect data comparable with past years with additional control and experimental portions at the distal end of the string. The basic portion of 24 multifilament nets and the control section of 4 multifilament nets were joined together in 1 continuous string with the experimental portion

separated from it by a 5-fathom line (figure 2). The length of the experimental portion was either 4 or 8 nets depending on the weather and expected catch. The control portion consisted of multifilament nets only, of the same mesh size and in the same order as the experimental section to provide a basis of comparison where the presence of monofilament nets in the experimental portion was the only variable.

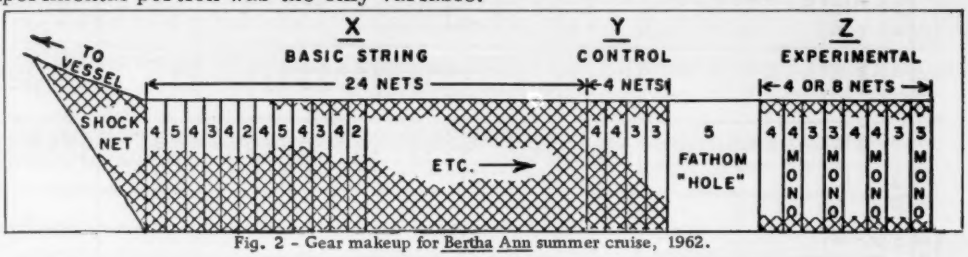

Fig. 2 - Gear makeup for Bertha Ann summer cruise, 1962.

FISHING ROUTINE: The complete net string (32 or 36 nets) was attached, by a 50-fathom line, to a heavy, triangular shock net made of purse-seine web. The shock net acted to absorb some of the strain of vessel surge against the gear and helped prevent the nets from rolling up due to vessel action. The shock net was then connected, through a swivel, to about 100 fathoms of heavy (1-inch nylon) riding line to the vessel.

The normal fishing routine was to set the net string at dusk in the evening, allow it to fish through the night, then haul it aboard early in the morning after sunrise. Setting time was about 45 minutes; hauling time averaged about 3 hours, depending on the size of the catch and weather conditions. Normally, the vessel remained moored to the string during the night but on occasion, when the weather became bad, the string was cast loose with lighted flag poles, radio buoys, or radar reflectors attached to it.

The nets were repaired daily by mending or when necessary, by replacement. However, through the season as the nets became worn and damaged, they were probably less efficient. The state of repair of the multifilament and monofilament nets is believed to have been equal at any one time.

RESULTS

COMPARISON OF GROSS CATCHES: Table 1 lists the salmon catches of all of the 1962 Bertha Ann sets by net type for the $3\frac{1}{4}$- and $4\frac{1}{2}$-inch mesh sizes. The catch per net of the multifilament and monofilament types varied widely from set to set but in 74 of the 79 comparisons the monofilament nets outfished the multifilament.

Table 2 gives the catch per effort statistics of the two types of nets averaged over the spring and summer seasons and the year. In all three comparisons the monofilament was at least 2.3 times as effective in catching salmon as was the multifilament. The $4\frac{1}{2}$-inch monofilament caught 6.5 times as many salmon per net as the multifilament during the spring season. Over the entire year, in both the $3\frac{1}{4}$- and $4\frac{1}{2}$-inch mesh sizes, the catch per unit of effort of the monofilament averaged over three times that of the multifilament.

The data presented in table 2 indicates that the monofilament nets were more efficient than the multifilament for all three species but the increased efficiency appears to be of a different magnitude for each species. Within both mesh sizes the relative efficiency of the monofilament is highest for chum salmon, intermediate for red salmon, and lowest for pink salmon.

COMPARISON OF LENGTH COMPOSITION: The study of length-frequencies of the two net types is confined to the summer season (sets 20-49) where both $3\frac{1}{4}$- and $4\frac{1}{2}$-inch mesh monofilament nets were used and where the catch was primarily immature red and chum salmon of different ocean ages.

Table 1 - Catch and Catch Per Unit of Effort of $3\frac{1}{4}$-Inch and $4\frac{1}{2}$-Inch Multifilament and Monofilament Nets by Set and Species, 1962

Set Number	Date	$3\frac{1}{4}$-Inch Multifilament									$3\frac{1}{4}$-Inch Monofilament								
		Number Red	Number Chum	Number Pink	Total	Number Nets	Catch Per Net			Total Catch Per Net	Number Red	Number Chum	Number Pink	Total	Number Nets	Catch Per Net			Total Catch Per Net
							Red	Chum	Pink							Red	Chum	Pink	
1	5/30																		
2	6/1																		
3	6/2																		
4	6/3																		
5	6/4																		
6	6/5																		
7	-																		
8	6/10																		
9	6/11																		
10	6/16																		
11	-																		
12	6/19																		
13	6/20																		
14	6/25																		
15	6/26																		
16	6/27																		
17	6/28																		
18	6/29	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0
19	6/30	0	0	0	0	2	0	0	0	0	0	1	0	1	2	0	0.50	0	0.50
20	7/2	4	4	0	8	2	2.00	2.00	0	4.00	44	15	0	59	2	22.00	7.50	0	29.50
21	7/12	222	45	3	270	8	27.75	5.63	0.38	33.75	136	74	2	212	2	68.00	37.00	1.00	106.00
22	7/14	121	14	0	135	8	15.13	1.75	0	16.88	68	6	0	74	2	34.00	3.00	0	37.00
23	7/15	39	18	3	60	8	4.88	2.25	0.38	7.50	13	16	0	29	2	6.50	8.00	0	14.50
24	7/17	8	4	0	12	8	1.00	0.50	0	1.50	45	5	1	51	2	22.50	2.50	0.50	25.50
25	7/18	48	4	1	53	8	6.00	0.50	0.13	6.63	94	3	2	99	2	47.00	1.50	1.00	49.50
26	7/19	86	6	1	93	8	10.75	0.75	0.13	11.63	84	5	1	90	2	42.00	2.50	0.50	45.00
27	7/21	63	6	1	70	7	9.00	0.86	0.14	10.00	53	2	0	55	1	53.00	2.00	0	55.00
28	7/22	17	0	0	17	8	2.13	0	0	2.13	54	4	0	58	2	27.00	2.00	0	29.00
29	7/23	35	2	0	37	8	4.38	0.25	0	4.63	12	2	0	14	2	6.00	1.00	0	7.00
30	7/24	118	5	0	123	8	14.75	0.63	0	15.38	40	5	0	45	2	20.00	2.50	0	22.50
31	7/25	96	15	2	113	7	13.87	2.15	0.29	16.16	50	9	0	59	1	50.00	9.00	0	59.00
32	7/31	55	2	0	57	7	7.87	0.29	0	8.15	19	1	0	20	1	19.00	1.00	0	20.00
33	8/4	72	2	1	75	8	9.00	0.25	0.13	9.38	44	2	0	46	2	22.00	1.00	0	23.00
34	8/8	57	7	0	64	8	7.13	0.88	0	8.00	11	0	0	11	2	5.50	0	0	5.50
35	8/9	51	3	0	54	8	6.38	0.38	0	6.75	55	1	0	56	2	27.50	0.50	0	28.00
36	8/10	14	3	0	17	7	2.00	0.43	0	2.43	29	1	0	30	1	29.00	1.00	0	30.00
37	8/11	76	9	0	85	7	10.87	1.29	0	12.16	15	0	0	15	1	15.00	0	0	15.00
38	8/13	101	4	0	105	7	14.44	0.59	0	15.02	19	0	0	19	1	19.00	0	0	19.00
39	8/14	74	1	0	75	7	10.58	0.14	0	10.73	18	0	0	18	1	18.00	0	0	18.00
40	8/15	5	0	0	5	7	0.72	0	0	0.72	0	0	0	0	1	0	0	0	0
41	8/18	4	1	0	5	7	0.57	0.14	0	0.72	1	0	0	1	1	1.00	0	0	1.00
42	8/19	2	4	0	6	7	0.29	0.57	0	0.86	4	3	0	7	1	4.00	3.00	0	7.00
43	8/20	5	0	0	5	7	0.72	0	0	0.72	3	0	0	3	1	3.00	0	0	3.00
44	8/27	16	20	0	36	8	2.00	2.50	0	4.50	15	14	0	29	2	7.50	7.00	0	14.50
45	8/28	12	12	0	24	8	1.50	1.50	0	3.00	11	15	0	26	2	5.50	7.50	0	13.00
46	8/29	13	10	0	23	8	1.63	1.25	0	2.88	5	8	0	13	2	2.50	4.00	0	6.50
47	8/30	15	13	0	28	8	1.88	1.63	0	3.50	4	7	0	11	2	2.00	3.50	0	5.50
48	8/31	4	28	0	32	8	0.50	3.50	0	4.00	4	10	0	14	2	2.00	5.00	0	7.00
49	9/2	3	32	0	35	8	0.38	4.00	0	4.38	1	48	0	49	2	0.50	24.00	0	24.50

		4½-Inch Multifilament									4½-Inch Monofilament								
1	5/30	1	14	4	19	29	0.03	0.48	0.14	0.66	12	13	1	26	2	6.00	6.50	0.50	13.00
2	6/1	26	28	6	60	26	1.00	1.08	0.23	2.31	15	35	3	53	2	7.50	17.50	1.50	26.50
3	6/2	10	11	8	29	26	0.38	0.42	0.31	1.12	14	13	2	29	2	7.00	6.50	1.00	14.50
4	6/3	41	40	44	125	26	1.58	1.54	1.69	4.81	24	13	4	41	2	12.00	6.50	2.00	20.50
5	6/4	6	27	10	43	26	0.23	1.04	0.38	1.66	21	21	9	51	2	10.50	10.50	4.50	25.50
6	6/5	26	41	21	88	26	1.00	1.58	0.81	3.39	17	16	1	34	2	8.50	8.00	0.50	17.00
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	6/10	28	27	7	62	26	1.08	1.04	0.27	2.39	9	4	3	16	2	4.50	2.00	1.50	8.00
9	6/11	49	45	9	103	26	1.88	1.73	0.35	3.97	21	20	4	45	2	10.50	10.00	2.00	22.50
10	6/16	39	2	1	42	26	1.50	0.08	0.04	1.62	9	10	0	19	2	4.50	5.00	0	9.50
11	—	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	6/19	19	6	0	25	26	0.73	0.23	0	0.96	13	1	0	14	2	6.50	0.50	0	7.00
13	6/20	16	6	12	34	26	0.62	0.23	0.46	1.31	4	7	5	16	2	2.00	3.50	2.50	8.00
14	6/25	45	19	4	68	26	1.73	0.73	0.15	2.62	27	10	0	37	2	13.50	5.00	0	18.50
15	6/26	24	24	2	50	26	0.92	0.92	0.08	1.93	10	4	0	14	2	5.00	2.00	0	7.00
16	6/27	16	7	1	24	26	0.62	0.27	0.04	0.92	11	9	1	21	2	5.50	4.50	0.50	10.50
17	6/28	68	25	10	103	26	2.62	0.96	0.38	3.97	24	15	1	40	2	12.00	7.50	0.50	20.00
18	6/29	0	0	0	0	15	0	0	0	0	0	0	0	0	2	0	0	0	0
19	6/30	0	0	0	0	16	0	0	0	0	0	0	0	0	2	0	0	0	0
20	7/2	60	14	6	80	15	4.00	0.93	0.40	5.34	36	8	0	44	2	18.00	4.00	0	22.00
21	7/12	252	208	82	542	14	17.99	14.85	5.85	38.70	65	34	36	135	2	32.50	17.00	18.00	67.50
22	7/14	135	56	18	209	15	9.00	3.74	1.20	13.94	22	9	6	37	2	11.00	4.50	3.00	18.50
23	7/15	25	28	63	116	16	1.56	1.75	3.94	7.25	12	19	16	47	2	6.00	9.50	8.00	23.50
24	7/17	47	2	13	62	16	2.94	0.13	0.81	3.88	2	6	2	10	2	1.00	3.00	1.00	5.00
25	7/18	89	6	34	129	16	5.56	0.38	2.13	8.06	27	1	12	40	2	13.50	0.50	6.00	20.00
26	7/19	134	6	50	190	16	8.38	0.38	3.13	11.88	30	7	9	46	2	15.00	3.50	4.50	23.00
27	7/21	37	4	7	48	15	2.47	0.27	0.47	3.20	12	1	2	15	1	12.00	1.00	2.00	15.00
28	7/22	18	12	1	31	16	1.13	0.75	0.06	1.94	10	5	2	17	2	2.50	1.00	1.00	4.50
29	7/23	57	15	2	74	16	3.56	0.94	0.13	4.63	14	3	0	17	2	7.00	1.50	0	8.50
30	7/24	155	4	8	167	16	9.69	0.25	0.50	10.44	38	1	1	40	2	19.00	0.50	0.50	20.00
31	7/25	78	4	37	119	15	5.20	0.25	2.47	7.94	10	1	4	15	1	10.00	1.00	4.00	15.00
32	7/31	39	2	2	43	15	2.60	0.13	0.13	2.87	4	0	1	5	1	4.00	0	1.00	5.00
33	8/4	124	9	1	134	16	7.75	0.56	0.06	8.38	46	2	0	48	2	23.00	1.00	0	24.00
34	8/8	115	20	1	136	16	7.19	1.25	0.06	8.50	11	4	0	15	2	5.50	2.00	0	7.50
35	8/9	149	12	0	161	16	9.31	0.75	0	10.06	95	2	1	98	2	47.50	1.00	0.50	49.00
36	8/10	70	13	0	83	15	4.67	0.87	0	0.54	8	0	0	8	1	8.00	0	0	8.00
37	8/11	141	22	1	164	15	9.40	1.47	0.07	10.94	14	0	0	14	1	14.00	0	0	14.00
38	8/13	166	7	0	173	15	11.07	0.47	0	11.54	2	0	0	2	1	2.00	0	0	2.00
39	8/14	66	7	1	74	15	4.40	0.47	0.07	4.94	10	1	1	12	1	10.00	1.00	1.00	12.00
40	8/15	29	8	0	37	15	1.93	0.53	0	2.47	4	0	0	4	1	4.00	0	0	4.00
41	8/18	47	7	2	5	15	3.13	0.47	0.13	0.33	4	2	0	6	1	4.00	2.00	0	6.00
42	8/19	15	33	0	48	15	1.00	2.20	0	3.20	4	8	0	12	1	4.00	8.00	0	12.00
43	8/20	3	19	1	23	15	0.20	1.27	0.07	1.53	2	5	0	7	1	2.00	5.00	0	7.00
44	8/27	47	23	0	70	16	2.94	1.44	0	4.38	16	6	0	22	2	8.00	3.00	0	11.00
45	8/28	23	5	0	28	16	1.44	0.31	0	1.75	7	8	0	15	2	3.50	4.00	0	7.50
46	8/29	14	6	0	20	16	0.88	0.38	0	1.25	5	5	0	10	2	2.50	2.50	0	5.00
47	8/30	1	8	0	9	16	0.06	0.50	0	0.56	2	1	0	3	2	1.00	0.50	0	1.50
48	8/31	3	8	0	11	16	0.19	0.50	0	0.69	0	1	0	1	2	0	0.50	0	0.50
49	9/2	2	64	14	80	16	0.13	4.00	0.88	5.00	0	18	1	19	2	0	9.00	0.50	9.50

Table 2 - Catch Per Unit of Effort of $3\frac{1}{4}$-Inch and $4\frac{1}{2}$-Inch Multifilament and Monofilament Nets and Relative Efficiency of Monofilament Nets by Species and Season

Season	$3\frac{1}{4}$-Inch Multifilament							$3\frac{1}{4}$-Inch Monofilament							Relative Efficiency of Monofilament		
	Number Red	Number Chum	Number Pink	Number Nets	Catch Per Net			Number Red	Number Chum	Number Pink	Number Nets	Catch Per Net					
					Red	Chum	Pink					Red	Chum	Pink	Red	Chum	Pink
Spring	0	0	0	4	0	0	0	0	1	0	4	0	0.25	2	-	-	-
Summer	1,436	270	12	223	6.44	1.21	0.05	951	256	6	49	19.41	5.22	0.12	3.01	4.31	2.40
Total	1,436	270	12	227	6.33	1.19	0.05	951	257	6	53	17.94	4.35	0.11	2.83	4.08	2.20
	$4\frac{1}{2}$-Inch Multifilament							$4\frac{1}{2}$-Inch Monofilament									
Spring	414	322	139	424	0.98	0.76	0.33	231	191	34	34	6.79	5.62	1.00	6.93	7.39	3.03
Summer	2,141	632	344	465	4.60	1.36	0.74	512	158	94	49	10.45	3.22	1.92	2.27	2.37	2.59
Total	2,555	954	483	889	2.68	1.07	0.54	743	349	128	83	8.95	4.20	1.54	3.34	3.93	2.85

	$3\frac{1}{4}$-Inch Multifilament			$3\frac{1}{4}$-Inch Monofilament			$4\frac{1}{2}$-Inch Multifilament			$4\frac{1}{2}$-Inch Monofilament			Relative Efficiency	
	Number Fish	Number Nets	Catch Per Net	Number Fish	Number Nets	Catch Per Net	Number Fish	Number Nets	Catch Per Net	Number Fish	Number Nets	Catch Per Net	$3\frac{1}{4}$-Inch	$4\frac{1}{2}$-Inch
Spring	0	4	0	1	4	0.25	875	424	2.06	456	34	13.41	-	6.51
Summer	1,718	223	7.70	1,213	49	24.76	3,117	465	6.70	764	49	15.59	3.22	2.33
Total	1,718	227	7.57	1,214	53	22.91	3,992	889	4.49	1,220	83	14.70	3.03	3.27

The length-frequencies for red salmon caught in the $4\frac{1}{2}$-inch and $3\frac{1}{4}$-inch monofilament and multifilament nets are shown in figures 3 and 4. In both mesh sizes the length range is about the same for both net types but the mean length of the fish taken in the monofilament nets is larger (table 3) although the difference is not statistically significant. The shapes of the curves for monofilament and multifilament catches within each mesh size are similar but

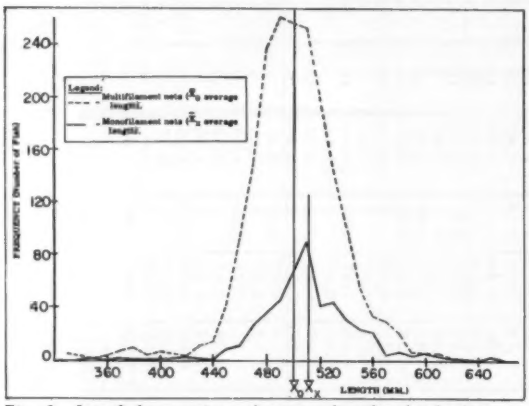

Fig. 3 - Length-frequencies and average lengths of red salmon caught in $4\frac{1}{2}$" monofilament and multifilament nets--summer 1962.

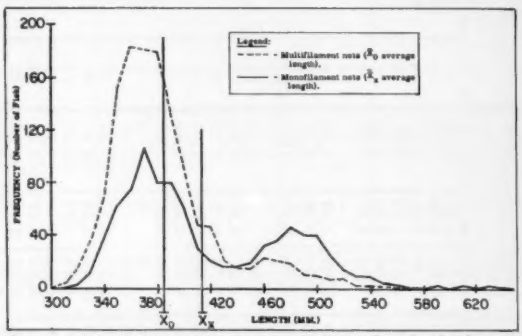

Fig. 4 - Length-frequencies and average lengths of red salmon caught in $3\frac{1}{4}$" monofilament and multifilament nets--summer 1962.

Table 3 - Mean Lengths (mm.) of Salmon Taken in Multifilament and Monofilament Gill Nets

Species	Mesh Size	Mono.	Multi.	Diff.	Statistical Significance
	Inches	. . . (Millimeters) . . .			
Red	$3\frac{1}{4}$	413.5	384.5	29.0	None
Chum	"	430.8	412.9	17.9	"
Red	$4\frac{1}{2}$	511.5	500.0	11.5	"
Chum	"	526.6	509.7	16.9	"
Pink	"	499.6	493.9	5.7	"

in the $3\frac{1}{4}$-inch nets the secondary (right-hand) mode is more pronounced in the monofilament indicating the capture of a larger proportion of an older age-group in that net type. This secondary mode is made up of the same age-class (two winters-at-sea) as the mode in the $4\frac{1}{2}$-inch mesh curves, but is centered at a slightly shorter length than that of the $4\frac{1}{2}$-inch mesh nets. Therefore, while the $3\frac{1}{4}$-inch monofilament nets do sample the older age class of red salmon, they select smaller individuals of that class.

Figures 5 and 6 show that chum salmon length-frequency curves are similar for monofilament and multifilament catches in the $3\frac{1}{4}$-inch mesh size but in the $4\frac{1}{2}$-inch nets the multifilament took smaller fish than the monofilament nets. Again, as with the red salmon, mean lengths were larger in the monofilament catches (table 3) although the difference is not sig-

nificant. From the shape of the $4\frac{1}{2}$-inch monofilament curve, it would appear that this type of net is efficient in taking chum salmon over a large length range in that there is no modal peak as in the multifilament curve but, instead, a low plateau from 460 mm. to 560 mm.

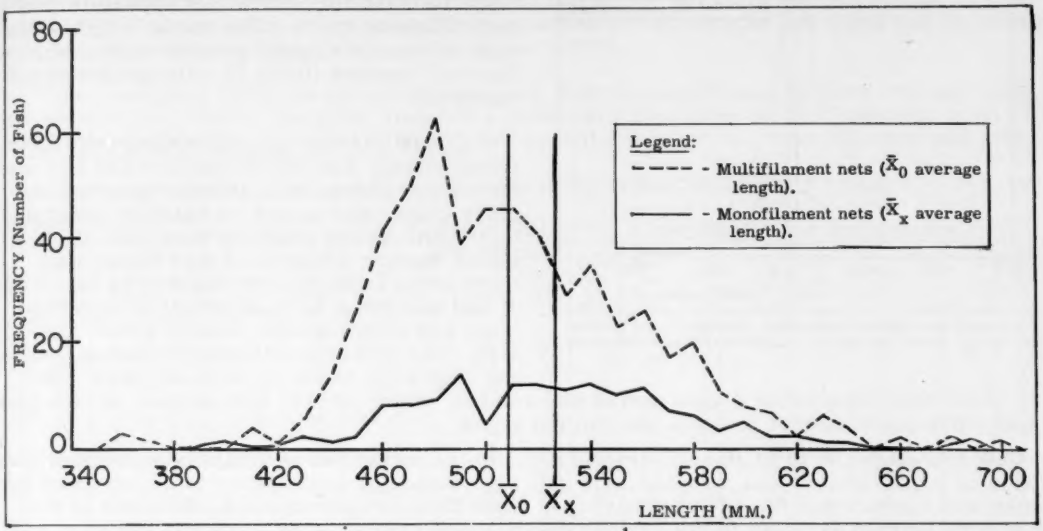

Fig. 5 - Length-frequencies and average lengths of chum salmon caught in $4\frac{1}{2}$" monofilament and multifilament nets--summer 1962.

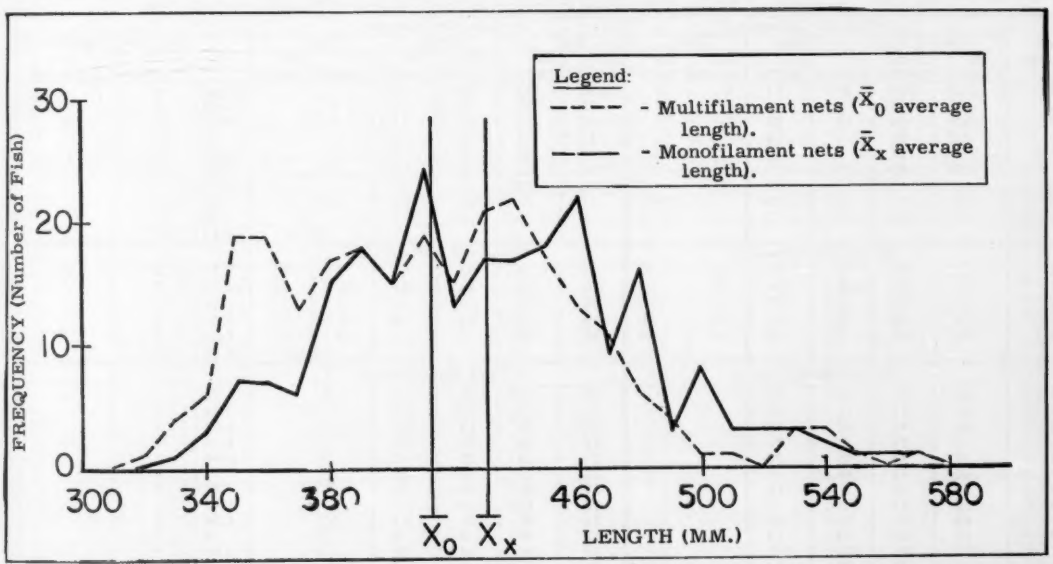

Fig. 6 - Length-frequencies and average lengths of chum salmon caught in $3\frac{1}{4}$" monofilament and multifilament nets--summer 1962.

So few pink salmon were taken in the $3\frac{1}{4}$-inch mesh nets that a meaningful length-frequency curve could be constructed only for fish caught in the $4\frac{1}{2}$-inch mesh nets. Only one age class, the mature, one winter-at-sea fish, appears in the catch. Figure 7 shows the length-frequency curves for pink salmon taken in the $4\frac{1}{2}$-inch multifilament and monofila-

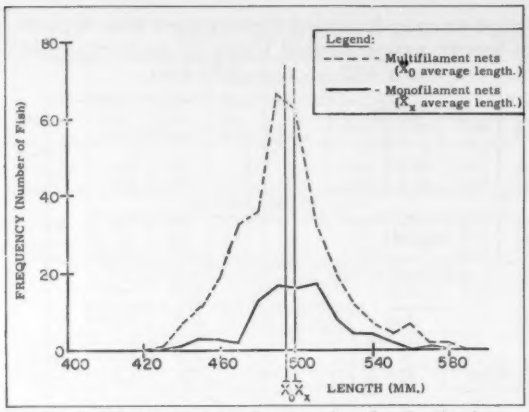

Fig. 7 - Length-frequencies and average lengths of pink salmon caught in $4\frac{1}{2}$" monofilament and multifilament nets--summer 1962.

ment nets. The length range of fish taken in the two net types is about the same but, as with the chum salmon, the sharp peak of the multifilament curve does not appear in the monofilament curve. The mean length of the pink salmon is slightly greater in the monofilament catches (table 3) although not significantly so.

COMPARISON OF AGE COMPOSITION: Experience[1/] has shown that one and two winter-at-sea red salmon and one year old and older chum salmon can be reliably separated by length. In the previous section (Comparison of Salmon Lengths) it was shown that there is no significant difference in the lengths of red and chum salmon caught in monofilament and multifilament nets of either mesh size. The direct relationship between length and age, then, leads to the conclusion that there is no difference in the proportion of one and two winter-at-sea red salmon, or one year old and older chum salmon taken in the two net types.

COMPARISON OF SPECIES COMPOSITION: In the comparative analysis of species composition of multifilament and monofilament gill net catches, a contingency table for catch by species was constructed for each set having at least five fish per species. Because of the lack of pink salmon samples in the $3\frac{1}{4}$-inch mesh, those comparisons were restricted to red and chum salmon. In the $4\frac{1}{2}$-inch mesh, five sets were usable with all three species, 18 with

Table 4 - Comparison of Species Composition in Catches of Multifilament and Monofilament Gill Nets

Set Number	$3\frac{1}{4}$-Inch Multifilament						$3\frac{1}{4}$-Inch Monofilament						X^2	Degrees of Freedom	Significance at 5 Percent
	Red		Chum		Pink		Red		Chum		Pink				
	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected			
21	222	200	45	67			136	158	74	52			22.01	1	√
22	121	122	14	13			68	67	6	7			0.24	1	
23	39	34	18	23			13	18	16	11			5.49	1	√
26	86	86	6	6			84	84	5	5			0	1	
30[1/]	118	116	5	7			40	42	5	3			2.06	1	
31	96	95	15	16			50	51	9	8			0.22	1	
44	16	17	20	19			15	14	14	15			0.25	1	
45	12	11	12	13			11	12	15	14			0.32	1	
46	13	12	10	11			5	6	8	7			0.48	1	
												Total	34.12	9	√
	$4\frac{1}{2}$-Inch Multifilament						$4\frac{1}{2}$-Inch Monofilament								
5	6	12	27	22	10	9	21	15	21	26	9	10	7.51	2	√
21	252	254	208	194	82	94	65	63	34	48	36	24	12.70	2	√
22	135	133	56	55	18	20	22	24	9	10	6	4	1.52	2	
23	25	26	28	33	63	56	12	11	19	14	16	23	5.69	2	
26[1/]	134	132	6	10	50	48	30	32	7	3	9	11	7.53	2	√
												Total	34.95	10	√
	$4\frac{1}{2}$-Inch Multifilament						$4\frac{1}{2}$-Inch Monofilament								
2	26	21	28	33			15	20	35	30			4.03	1	√
3	10	11	11	10			14	13	13	14			0.34	1	
4	41	45	40	36			24	20	13	17			2.54	1	
5	6	12	27	21			21	15	21	27			8.44	1	√
6	26	29	41	38			17	14	16	19			1.66	1	
9	49	49	45	45			21	21	20	20			0	1	
14	45	46	19	18			27	26	10	11			0.21	1	
16	16	14	7	9			11	13	9	7			1.61	1	
17	68	65	25	28			24	27	15	12			1.54	1	
20	60	60	14	14			36	36	8	8			0	1	
21	252	261	208	199			65	56	34	43			4.05	1	√
22	135	135	56	56			22	22	9	9			0	1	
23	25	23	28	30			12	14	19	17			0.83	1	
26[1/]	134	130	6	10			30	34	7	3			7.52	1	√
28	18	19	12	11			10	9	5	6			0.42	1	
44	47	48	23	22			16	15	6	7			0.28	1	
45	23	20	5	8			7	10	8	5			4.28	1	√
46[1/]	14	13	6	7			5	6	5	4			0.64	1	
												Total	38.39	18	√

1/Includes 1 expected value of <5.

1/Unpublished data, U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Biological Laboratory, Seattle, Wash.

red and chum salmon only. The contingency tables provide expected values with which the observed catch by species can be compared by chi-square tests. Table 4 lists the observed, expected, and chi-square values for each set and the total chi-square values for each mesh size. This series of tests, in effect, compares the set by set ratio of red to chum to pink (where pink salmon were caught in sufficient numbers) between the net types and is independent of changes in abundance, species ratios, or effort.

The results of all three series of tests, $3\frac{1}{4}$-inch red and chum, $4\frac{1}{2}$-inch red and chum, and $4\frac{1}{2}$-inch red, chum, and pink, indicate significant differences at the 5 percent level between the species composition of the catches in multifilament and monofilament gill nets.

There appears to be no consistency in the differences between net types.

Table 5 - Catch Comparisons Between Multifilament Nets in Portions of String With and Without Monofilament Nets

Number Set	X-Basic			Y-Control			Z-Experimental			X'-Basic			Y'-Control			Z'-Experimental		
	Number $3\frac{1}{4}$" Nets	Number Salmon	Catch Per Net	Number $3\frac{1}{4}$" Nets	Number Salmon	Catch Per Net	Number $3\frac{1}{4}$" Nets	Number Salmon	Catch Per Net	Number $4\frac{1}{2}$" Nets	Number Salmon	Catch Per Net	Number $4\frac{1}{2}$" Nets	Number Salmon	Catch Per Net	Number $4\frac{1}{2}$" Nets	Number Salmon	Catch Per Net
21	4	95	23.6	2	86	43.0	2	89	44.5	12	392	32.7	2	94	47.0	1	56	56.0
22	4	79	19.8	2	31	15.5	2	25	12.5	12	167	13.9	2	30	15.0	1	18	18.0
23	4	21	5.3	2	25	12.5	2	14	7.0	12	88	7.3	2	20	10.0	2	13	6.5
24	4	10	2.5	2	0	0	2	2	1.0	12	51	4.3	2	11	5.5	2	3	1.5
25	4	30	7.5	2	7	3.5	2	16	8.0	12	99	8.3	2	17	8.5	2	13	6.5
26	4	64	16.0	2	15	7.5	2	15	7.5	12	137	11.4	2	29	14.5	2	25	12.5
27	4	44	11.0	2	27	13.5	1	0	0	12	41	3.4	2	6	3.0	1	3	3.0
28	4	6	1.5	2	8	4.0	2	3	1.5	12	24	2.0	2	4	2.0	2	6	3.0
29	4	16	4.0	2	12	6.0	2	9	4.5	12	61	5.1	2	11	5.5	2	7	3.5
30	4	78	19.5	2	33	16.5	2	13	6.5	12	135	11.3	2	20	10.0	2	18	9.0
31	4	71	17.8	2	38	19.0	1	8	8.0	12	106	8.8	2	18	9.0	1	5	5.0
32	4	31	7.8	2	20	10.0	1	8	8.0	12	42	3.5	2	3	1.5	1	1	1.0
33	4	44	11.0	2	23	11.5	2	9	4.5	12	104	8.7	2	19	9.5	2	18	9.0
34	4	44	11.0	2	19	9.5	2	9	4.5	12	125	10.4	2	13	6.5	2	5	2.5
35	4	17	4.3	2	21	10.5	2	16	8.0	12	127	10.6	2	10	5.0	2	25	12.5
36	4	11	2.8	2	6	3.0	1	1	1.0	12	81	6.8	2	15	7.5	1	1	1.0
37	4	52	13.0	2	23	11.5	1	10	10.0	12	145	12.1	2	16	8.0	1	4	4.0
38	4	75	18.8	2	27	13.5	1	3	3.0	12	156	13.0	2	13	6.5	1	9	9.0
39	4	46	11.5	2	27	13.5	1	3	3.0	12	70	5.8	2	11	5.5	1	7	7.0
40	4	3	0.8	2	1	0.5	1	1	1.0	12	24	2.0	2	3	1.5	1	3	3.0
41	4	4	1.0	2	1	0.5	1	0	0	12	63	5.3	2	4	2.0	1	1	1.0
42	4	1	0.3	2	5	2.5	1	0	0	12	30	2.5	2	9	4.5	1	10	10.0
43	4	4	1.0	2	1	0.5	1	0	0	12	20	1.7	2	2	1.0	1	2	2.0
44	4	19	4.8	2	11	5.5	2	6	3.0	12	47	3.9	2	13	6.5	2	9	4.5
45	4	16	4.0	2	6	3.0	2	3	1.5	12	20	1.7	2	5	2.5	2	3	1.5
46	4	13	3.3	2	8	4.0	2	2	1.0	12	15	1.3	2	2	1.0	2	3	1.5
47	4	14	3.5	2	9	4.5	2	5	2.5	12	7	0.6	2	0	0	2	2	1.0
48	4	7	1.8	2	7	3.5	2	13	6.5	12	10	0.8	2	3	1.5	2	0	0
Total	112	915	8.2	56	497	8.9	45	283	6.3	336	2,387	7.1	56	401	7.2	43	270	6.3

Number Set	Basic Experimental		Control Experimental		Basic Control	
	$3\frac{1}{4}$-Inch D	$4\frac{1}{2}$-Inch D'	$3\frac{1}{4}$-Inch D	$4\frac{1}{2}$-Inch D'	$3\frac{1}{4}$-Inch D	$4\frac{1}{2}$-Inch D'
21	-20.9	-23.3	- 1.5	- 9.0	-19.4	-14.3
22	7.3	- 5.1	3.0	- 3.0	4.3	- 1.1
23	- 1.7	0.8	5.5	3.5	- 7.2	- 2.7
24	1.5	2.8	- 1.0	4.0	2.5	- 1.2
25	- 0.5	1.8	- 4.5	2.0	4.0	- 0.2
26	8.5	- 1.1	0	2.0	8.5	- 3.1
27	11.0	0.4	13.5	0	- 2.5	0.4
28	0	- 1.0	2.5	- 1.0	- 2.5	0
29	- 0.5	1.6	1.5	2.0	- 2.0	- 0.4
30	13.0	2.3	10.0	1.0	3.0	1.3
31	9.8	3.8	9.2	4.0	- 1.2	- 0.2
32	- 0.2	2.5	2.0	0.5	- 2.2	2.0
33	6.5	- 0.3	7.0	0.5	- 0.5	- 0.8
34	6.5	7.9	5.0	4.0	1.5	3.9
35	- 3.7	- 1.9	2.5	- 7.5	- 6.2	5.6
36	1.8	5.8	2.0	6.5	- 0.2	- 0.7
37	3.0	8.1	1.5	4.0	1.5	4.1
38	15.8	4.0	10.5	- 2.5	5.3	6.5
39	8.5	- 1.2	10.5	- 1.5	- 2.0	0.3
40	- 0.2	- 1.0	- 0.5	- 1.5	0.3	0.5
41	1.0	4.3	0.5	1.0	0.5	3.3
42	0.3	- 7.5	2.5	5.5	- 2.2	- 2.0
43	1.0	- 0.3	0.5	- 1.0	0.5	0.7
44	1.8	- 0.6	2.5	2.0	4.3	- 2.6
45	2.5	0.2	1.5	1.0	1.0	- 0.8
46	2.3	- 0.2	3.0	- 0.5	- 0.7	0.3
47	1.0	- 0.4	2.0	- 1.0	- 1.0	0.6
48	- 4.7	0.8	- 3.0	1.5	- 1.7	- 0.7
Total	70.7	3.2	88.2	5.5	-14.3	- 1.3
D_2	2.52	0.11	3.15	0.19	- 0.51	- 0.05
sd	46.21	32.26	18.84	12.21	24.82	13.36
d.f.	27	27	27	27	27	27
t	1.95	0.10	3.84	0.28	- 0.54	- 0.07
Significant level	10%	-	0.1%	-	-	-

EFFECT OF MONOFILAMENT NETS ON ADJACENT MULTIFILAMENT NETS: The design of the Bertha Ann net string during the summer season was such that any effect the monofilament nets had on the adjacent or nearby multifilament nets could be detected. For convenience, the following designations are given to the different portions of the net string (fig. 2):

X--24 nets of basic string (multifilament)
Y--4 nets of control portion (multifilament)
Z--4 or 8 nets of experimental portion (multifilament and monofilament)

The Z portion was separated from the remainder of the string by a five-fathom line to make it an isolated unit. This portion was made up of alternated multifilament and monofilament nets of both mesh sizes.

The analytic procedure was to compute the difference in total catch per net, of the multifilament nets only, between portions X and Z (basic--experimental) and Y and Z (control--experimental) for each set (table 5). A comparison was also made between portions X and Y (basic--control) as a check of homogeneity in the two portions having no monofilament nets. These comparisons, of course, were done separately for the two mesh sizes. In table 5, the symbols X, Y, Z, and D refer to $3\frac{1}{4}$-inch mesh nets and X', Y', Z', and D' to $4\frac{1}{2}$-inch mesh nets.

The set by set differences (D and D') in the three comparisons were totaled and averaged, their variances computed, and a "t" test applied to each comparison for each mesh size. The hypothesis to be considered is that there is no difference between the catch per net (multifilament only) of the portions of the string with and without monofilament nets.

The results show, at the 10 percent level, that there is no difference between the catches in $4\frac{1}{2}$-inch multifilament nets in portions of the string with and without monofilament present. Therefore, the presence of monofilament nets has no significant effect on adjoining $4\frac{1}{2}$-inch multifilament nets. However, the "t" tests show that the catches of salmon in $3\frac{1}{4}$-inch multifilament nets in the control and basic portions are significantly different from the catches in the $3\frac{1}{4}$-inch multifilament nets in the experimental section indicating that, for this mesh size, the presence of monofilament nets decreases the catch of adjoining multifilament nets. The basic-control comparisons indicate no difference in catch per net of the two portions of the string containing no monofilament nets.

A summary of the catch per multifilament net for each mesh size of the three portions of the string is given in table 6.

Table 6 - Average Salmon Catch Per Net in Multifilament Nets of Portions of the Net String With and Without Monofilament Nets Present

String Portion	Catch Per $3\frac{1}{4}$-Inch Net	Catch Per $4\frac{1}{2}$-Inch Net
X (basic)	8.2	7.1
Y (control)	8.9	7.2
Z (experimental)	6.3	6.3

The fact that the catch per net of the $4\frac{1}{2}$-multifilament nets in the experimental portion is less than in the other sections leads to the general conclusion that catch per unit of effort is reduced in both mesh sizes of multifilament nets when monofilament nets are present, although the difference has statistical significance only for the $3\frac{1}{4}$-inch mesh size.

CONCLUSIONS

Based on the preceding analyses, monofilament gill nets alternated with multifilament nets can be described as:

(1) outfishing a string of multifilament nets by at least 2 to 1;

(2) catching salmon of the same mean length as the multifilament nets;

(3) catching 1 and 2 winter-at-sea red salmon and 1-year-old and older chum salmon in the same proportion as the multifilament nets;

(4) taking different proportions of red, chum, and pink salmon than do the multifilament nets;

(5) significantly reducing the catch of adjacent or nearby $3\frac{1}{4}$-inch multifilament nets and possibly reducing the catch of adjacent $4\frac{1}{2}$-inch multifilament nets.

In general, monofilament gill nets appear to be superior to multifilament nets as a salmon-sampling device on the high seas because they greatly outfish the multifilament nets. Although their catches may differ in species composition, they sample the same populations of red, chum, and pink salmon as do the multifilament nets.

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PEST PLANT CONTROL ACHIEVED

Control of the pest plant, Eurasian watermilfoil (Myriophyllum spicatum) has been achieved under certain conditions in tests made by the U. S. Bureau of Commercial Fisheries in collaboration with the Maryland Game and Inland Fish Commission, the Chesapeake Biological Laboratory, Solomons, Md., and the Virginia Institute of Marine Science, Gloucester Point, Va.

Granules of the non-volatile ester of 2,4-D applied at 20-30 pounds acid equivalent per acre will control the pest plant without harming native vegetation. Water conditions and season of flowering of the plant must be considered in planning control operations. Effective control in tidal areas is possible only during a specific vulnerable period when the water is over 18° C. (64.4° F.) and before the plants begin flowering. The vegetative growth of the Eurasian watermilfoil should be sufficiently extensive to form a loosely woven mat of growth from top to bottom that will keep the herbicide from dispersing. In more protected areas, 2,4-D can be applied irrespective of tide. Elsewhere the best results come from treatment during the low-water slack just before ebb tide. In Chesapeake Bay, the best time for treatment is during the last 10 days of May or the first week of June.

Preliminary toxicological studies have indicated that the treatments do not directly damage macroscopic organisms, but further studies of this type are to be made. Effects of 2,4-D on oysters and clams were being studied at the Robert A. Taft Sanitary Engineering Center.

PRESENT AND FUTURE MARKET FOR FISH OIL[1/]

By John A. Dyer*

ABSTRACT

Primary technical needs for improving the future of the fish oil industry are (1) a commercial method of separating the fatty acids or other derivatives and (2) development of markets demanding the highly unsaturated fatty acid compounds to be derived from fish oil.

In developing potential markets, however, we must not neglect the existing ones.

INTRODUCTION

The market for fish oil will undergo great changes in the future. Although I can't predict the changes in detail, I can report my observations and conclusions based on a preliminary economic and technical survey. The purpose of this article is to make these results available to industry.

In this article, I sketch major past and present uses of fish oil, give the needs of a market that fish oil could enter, and cover the unique property of fish oil. Finally, I show what can happen when technical research adapts characteristics of an oil to the demands of a substantial market.

MAJOR PAST AND PRESENT USES

The largest of all domestic markets for fish oil from 1935 to 1945 was the soap industry, when it used about 89 million pounds of fish oil per year (U. S. Bureau of the Census 1932-1962). This market dropped below 0.5 million pounds per year in 1951 and has remained below that level since. The drop occurred at a time when the price of fish oil was rising steeply and synthetic detergents were taking much of the soap market.

Over the years, drying-oil products--such as paints, varnishes, linoleum, and oilcloth--represent the most consistent large market for fish oil. During the past decade, drying-oil products have consumed an average of about 30 million pounds of fish oil per year. This market appears to be steady in the long-range view. Fish oil, being a natural drying oil, is used in the paint and varnish field as heat-bodied and blown oils and as modifiers in alkyd and other synthetic resins.

Fish oil was used extensively in this country in food products such as shortenings and margarines, reaching a maximum rate of 40 million pounds in the year of 1936. This domestic use has dropped below 0.5 million pounds per year since 1946, except in the years of 1950 and 1951 when higher usage was indicated, but available data do not state how much higher (U. S. Bureau of the Census 1932-1962). A large part of our recent production of fish oil has been exported to Europe for use in the manufacture of margarine.

NEEDS OF A MARKET THAT FISH OIL CAN ENTER

The most probable major market for fish oil in the future was aptly indicated in a recent chemical trade publication by the headline "Fats are seen likely to gain parity with coal and petroleum as organic chemical sources" (Oil, Paint and Drug Reporter 1962).

To enter the sophisticated chemical markets akin to those for the derivatives from coal and petroleum calls for considerably more development of fish-oil technology than we now

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1/Talk presented to the Virginia Fishermen's Association, February 13, 1962, at Old Point Comfort, Va.

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have. In the past, the users' requirements were flexible and non-specific enough so that he could accept a crudely extracted product that deteriorated to some extent on storage. The market for fatty oils now is more competitive and demands fish oils with greater freedom from such problem materials as free fatty acids, proteinaceous matter, excessive stearine, color bodies, and moisture. Although the fish oil industry is making progress toward a cleaner and hence more useful and stable product, the markets for fish oil are dynamically changing in the direction of demanding tighter specifications and even new basic qualities.

Demands in today's chemical markets are shifting toward purer, single chemical compounds or at least compounds within narrower ranges of chemical grouping. Fish oil can't escape from this trend if it is to break through into the high-priced markets its unique feature should command. To keep up with this trend, the industry must develop a commerically feasible process for separating fish oil into its component fatty acids or their simple derivatives. The fatty acids from fish oil are particularly difficult to separate because of their unusual chemical complexity. For instance, there are about 15 different fatty acids in hydrolyzed menhaden oil, considering only those present in relative concentrations of one percent or more (Ahrens et al 1959; and Gruger 1961[2/]). This number is about double the highest number found in the same concentrations from any of the other major commercial fats and oils (Hilditch 1956; and Archer-Daniels-Midland no date). Practical methods for separating fish oil fatty acids or their derivatives are being sought in commercial and governmental research laboratories. Such methods must be found before advantage can be taken of the potentially favorable property unique to fish oil.

UNIQUE PROPERTY OF FISH OIL

The most-promising unique property of fish oil is its great concentration of highly unsaturated fatty acid compounds. Twenty to 30 percent of the fatty acids derived from menhaden oil are unsaturated to the extent of 4, 5, and 6 double bonds (Ahrens et al 1959; and Gruger 1961[2/]). None of the other major oils can supply more than mere traces of these highly unsaturated fatty acids. Thus, the future of fish oil will find its greatest security and its highest value in the development of markets for which this high degree of unsaturation is essential. The most probable markets at present are in derivatives for manufacturing improved plastics.

WHAT HAPPENS WHEN RESEARCH ADAPTS CHARACTERISTICS TO DEMANDS

The effect of the kind of development that the fish oil industry needs is illustrated in figure 1.

Soybean oil, being a semidrying oil, was unsuitable--except in low concentration--for the paint and varnish manufacturing processes employed prior to 1930. By 1933, however, processes had been developed for the manufacture of alkyd resins incorporating drying or semidrying oils as modifiers (Golding 1959). Through this technical development, soybean oil advanced in a few years from a minor to a major competitor in the field of drying oils, climbing from 2 to 22 percent of the supply for the drying-oil products market over a period of about 20 years.

Tall oil, another semidrying oil, made a spectacular entry into the drying-oil market in 1943. Prior to that time, the high content of rosin acid in tall oil made it unacceptable in the drying-oil market. During the early forties, technical advances in the processing of tall oil resulted in commercially economic methods for reducing rosin acids to concentrations below 1 percent (Pattison 1959). Tall oils, thus qualified for use in alkyds, climbed abruptly from 0 to 13 percent of the drying-oil products market in 12 years. These are examples of what the right technical developments could do for fish oil in drying-oil products or other markets.

Linseed oil comprised 90 percent of the oil for the drying-oil products market in 1925, as shown in figure 2. This level was cut in half by 1958. The decline was due largely to the

2/Gruger, E. H., November 1961, "Results of Single Analyses of Commercial Crude Menhaden Oils, by Gas-Liquid Chromatography"; unpublished.

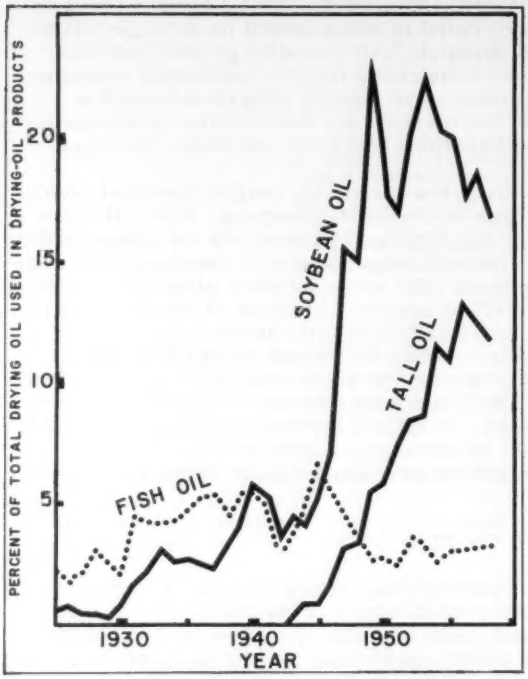

Fig. 1 - Relative use of fish oil, soybean oil, and tall oil in drying-oil products (U. S. Bureau of the Census, 1932 to 1961; and Banna 1954).

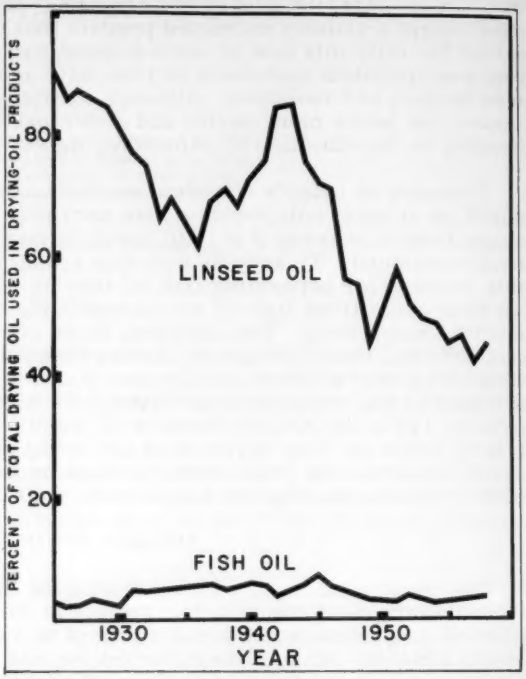

Fig. 2 - Relative use of fish oil and linseed oil in drying-oil products (U. S. Bureau of the Census, 1932 to 1961; and Banna 1954).

aggressive development of the competing oils shown in figure 1. Thus domination of a market can be countered with the aid of well-chosen technical developments.

SUMMARY

The great needs of the fish-oil industry are (1) practical methods for the separation of the complex set of fatty acid compounds in fish oil and (2) development of strong durable markets for the highly unsaturated fatty acids or their derivatives.

In the meantime, present day uses of fish oil can't be overlooked. Fish oil must be improved in quality, and current fish oil markets must be expanded to meet today's rising world production of fish oil and increasing competition from other oils.

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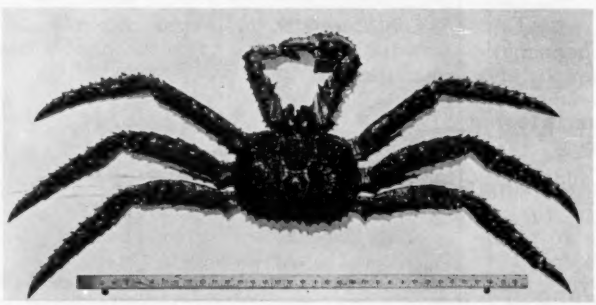
ALASKAN KING CRABS DONATED TO PHILADELPHIA AQUARAMA

Unexpected visitors to the National Fisheries Institute 18th Annual Convention in Philadelphia, Pa., April 26-30, 1963, were four giant Alaskan king crabs--alive and kicking.

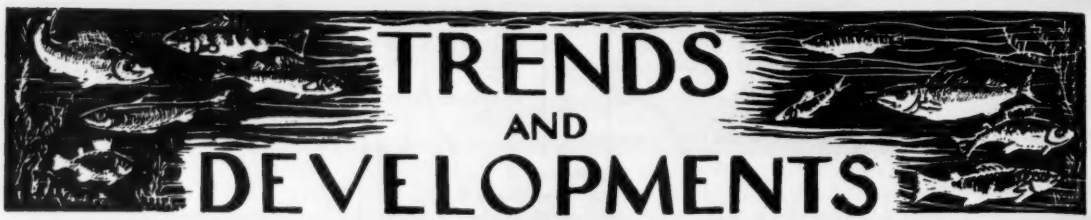


Actually, these Paralothides camachatica never got to Convention Headquarters--they were dropped off at the Philadelphia Aquarama, where they will make their permanent home.

The king crabs were donated to the new aquarama by an Alaskan firm. They will be on display at the aquarama in a flood-lighted tank, with water kept to their favorite temperature. The crabs traveled in style by jet plane, packed in wet burlap and ice, and chaperoned by the manager of the firm's plant at Seldovia, Alaska. The trip took about 30 hours. The crabs were caught in Cook Inlet, an arm of the Gulf of Alaska.

These specimens bring to six the total of live Alaskan king crabs in the United States. The only other ones are at the New York Zoological Society's Aquarium in New York City.

These crabs--young ones chosen to withstand the hard trip--are typical of the Alaskan king crab canned and frozen for commercial consumption. In 1962, about six million of their brothers were caught and processed for the United States market. (Only the male king crabs are taken, and these must be at least 7 years old.) The Alaskan king crab as a frozen or canned seafood product is a postwar development and one which has been quickly accepted by the American homemaker.



Alaska

PROMOTIONAL CAMPAIGN FOR CANNED SALMON PROPOSED:

Salmon canning company representatives have suggested to the State Legislature that Alaska join with the industry in a campaign to promote the sale of canned salmon. As of February, it was reported that one million cases of pinks, 300,000 cases of reds, and 300,000 cases of chums of last year's salmon pack remained in warehouses unsold. That supply represents the packs of the smaller firms. Packs of the major brand labels have been marketed. The representatives stated that the primary reason the off-brand packs of salmon were not selling is that "canned salmon is losing shelf-space in the retail grocery stores."

The proposed advertising campaign would cost $1.5 million a year with the State furnishing $1.0 million and the packers $0.5 million. It was suggested that the State could obtain approximately $0.5 million by increasing the tax on unprocessed salmon which now runs about 3 percent of the value of the canned product. The proposal is currently under study by the State.

* * * * *

SALMON FORECASTS FOR 1963:

Bristol Bay: The expected total run of red salmon to Bristol Bay during 1963 is 15.6 million fish. This is based on an estimated return of 8.5 million "2-ocean" red salmon plus 7.1 million "3-ocean." The total estimate is about 2.8 million fish more than the actual return in 1962, which was a relatively poor year. Besides the usual inaccuracies inherent in the forecasts was added the inadequacy of information on the Japanese high-seas catch. Because of the difficulty in estimating the Japanese catch and the disparity of the estimates obtained by the different methods, the forecasters were unable to predict the distribution of the 15.6 million fish to the various fishing districts of Bristol Bay.

Prince William Sound: The run of pinks will be at least intermediate in size and there are some indications that it might be of large size, approaching the maxims of past years of more than 8 million fish. The run is expected early with fair fishing in some localities by July 1 and with heavy fishing during the last two weeks of July. A sharp decline in catches is expected in early August.

The chum salmon run may also be of fair size since frequently good runs of chums are associated with good runs of pinks. There was little basis for forecast of any run of red salmon in Prince William Sound.

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JOINT ROE-HERRING FISHERY PLANNED:

A joint Japanese-Alaskan roe-herring fishery may be initiated this year in Prince William Sound. Japanese interests have been negotiating with a packing company to supply about 3,000 tons of roe-herring from the Prince William Sound area for landing aboard a Japanese mothership inside Alaska territorial waters. The roe would be brine-cured and the herring frozen. During the first year of operation, Japanese labor would process the fish aboard ship. United States vessels would supply the roe-herring at a price of $40 a ton. The landings would be subject to the State raw fish tax of 4 percent. The arrangement appears agreeable with the Cordova Marketing Association and with certain State and Federal officials. Approval is required of the U. S. Department of Labor for use of Japanese nationals for the processing of fish in territorial waters. If the first year's operation was approved and a second were feasible, it appeared that the State would require use of Alaska labor for processing during the second and any subsequent years.

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LATEST ADDITION TO KING CRAB FLEET HEADS NORTH:

The latest vessel to be converted exclusively for king crab fishing is the Shishaldin,

which has been chartered by a king crab fishing and processing firm. The 159' x 24' steel vessel will fish among the Shumagin and Aleutian Islands, and land her catches at Sand Point. The vessel is a former LCI (Landing Craft Infantry) and has a capacity of about 15,000 crabs in two forward tanks.

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1963 KING CRAB PACK PROMISING:

The Laboratory Director of the Ketchikan Technological Research Laboratory visited shrimp and king crab processing plants in south central Alaska during February. He

The crab-fishing boat Irene G moved alongside a processing vessel, Alaska Trader, in bottle-necked Finger Bay at Adak, in the Aleutians.

reported that the king crab fishery was near its yearly peak of production, and that all ten plants visited were operating near capacity. Reports from Lazy Bay on Kodiak Island, and from Adak in the Aleutian Chain indicated record seasons for king crab in those areas.

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NEW SHRIMP-PROCESSING PLANT:

A new shrimp plant in Kodiak began operating in mid-January. The plant has three peeling machines and packs both canned shrimp and frozen shrimp logs. The shrimp logs are similar to those manufactured at a plant in Seward and are being sold to a New Orleans firm for slicing, breading and marketing.

Alaska Fisheries Investigations

EARLY PLANKTON BUILD-UP INDICATED:

The following is a report of February 1963 activities and studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Auke Bay, Alaska:

The standing crop of surface zooplankton in Auke Bay is on the increase after the December-January low. This was determined on a schedule of night and day sampling cruises by the oceanography power barge Murre II. Among the plankton were organisms not observed before in Auke Bay, including one copepod, two amphipods, and an isopod. Procedures have been perfected for best use of the Miller high-speed plankton sampler and the in situ electrical salinometer and thermometer with the result that plankton and water data sampling is now accomplished very efficiently from the Murre II. Average temperature in the Auke Bay area for 23 stations was 3.8° C. (38.8° F.), while the average surface salinity was 29.7‰ (parts per thousand) and the average bottom salinity was 31.1‰.

A cooperative cruise with University of Alaska Marine Sciences Institute scientists at Douglas was also made with the Murre II in Taku Inlet. Samples were taken from the face of the glacier down channel through the long intermixing areas. A surprisingly high pH of 9.2 was recorded in the glacier flow. Both Auke Bay and Taku Inlet will show considerable increase in fish abundance with the end of winter.

These marine sampling cruises by the Murre II provide environmental background data for determining the factors which affect occurrence and abundance of fish such as young and adult salmon, herring, and smelt in the inshore areas of Alaska.

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ACTIVE KING CRAB FISHERY PRODUCES TAGS:

A larger volume of tag return data was received during February from the Alaska Department of Fish and Game Kodiak Research Center and processed at the Auke Bay Laboratory than in all previous months since the Alaska Peninsula king crab tagging study was initiated in July 1962. This was probably the result of intensified commercial fishing pressure coupled with the normal spawning migration habits of king crabs. A total of 319 recaptured tagged crabs was reported

during February. Two tags were recovered from those which had been released in 1957 by the U. S. Bureau of Commercial Fisheries Montlake Biological Research Laboratory. Fifty-four of the tags had been released a year ago by the International Pacific Halibut Commission incidental to a trawl survey. The Bureau staff aboard the vessels Yaquina and Paragon, under charter to the Alaska Region of the Bureau, released tagged crabs last summer also in the Kodiak-Alaska Peninsula areas, and 238 of these were recaptured in February. These recoveries are from a total release last year of 8,719 tagged crabs.

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INITIAL SHRIMP SAMPLING SUCCESSFUL: The new shrimp studies started in the summer of 1962 by the Auke Bay Biological Laboratory have had good success with initial trials of its sampling gear in the surrounding waters of the Kasitsna Bay Shellfish Station near Homer in Cook Inlet. The 10-foot try net has been working out well for sampling adult shrimp in Tutka Bay and Sadie Cove. Drags of 20 minutes in 45 to 50 fathoms have produced 75 pounds of shrimp. Most of the commercial species were taken in the trawl. Experimental shrimp pots in 20 fathoms of water in Tutka Bay were taking commercial species of shrimp on both rocky and mud bottoms, although there was some difference in occurrence of species noted. The samples are part of intensive life history studies of the commercially important shrimp to determine growth and reproductive and mortality rates as a basis for management of the resource.

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FISHERMEN'S COURSE AT KETCHIKAN: The staff of the U. S. Bureau of Commercial Fisheries Technological Research Laboratory at Ketchikan cooperated with the University of Alaska in presenting a Fisheries Short Course in Ketchikan during February. An associate professor of fisheries biology in the Department of Wildlife Management at the University, supervised the course. It included 18 hours of instruction in basic oceanography, fishery biology, navigation, electronic aids, and handling, processing, and marketing of fishery products.

California

FISH PLANTED BY AIR FOR SPORTSMEN: A total of 4,939,510 fingerling trout and salmon were air-dropped in 789 remote lakes in 1962, by the California Department of Fish and Game. In the previous year, 3,729,877 fish were planted by air in 804 lakes.

A breakdown of the various kinds of fish planted in 1962 shows air-planting of 1,708,495 rainbow trout, 1,278,290 eastern brook trout, 1,259,995 kokanee salmon, 371,790 cutthroat trout, 165,440 kamloops trout, and 155,500 golden trout.

California has found that fish planting by air saves time and is more economical than stocking remote areas by pack train or vehicle. (Outdoor California, February 1963.)

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FISHERY PROJECTS CONSIDERED UNDER ACCELERATED PUBLIC WORKS PROGRAM: Accelerated Public Works construction proposals submitted to the California Wildlife Conservation Board for consideration at a meeting on March 21, 1963, included the following fishery projects:

Hayfork Falls Fish Ladder Cost ($49,800): The project would provide passage over a natural barrier which now prevents fish migration up Hayfork Creek, tributary to the South Fork of the Trinity River, Trinity County.

The California Department of Fish and Game estimates that the fishway would open up 19.8 miles of spawning and nursery area, primarily for steelhead, and would add about 3,000 steelhead to the Trinity River run.

Caspar Creek Fish Counting Weir Cost ($50,000): The project would be located on Caspar Creek near Fort Bragg, Mendocino County. The weir, which would be operated by the Department of Fish and Game, would be used in the 12 to 15 year study on fishery stocks now being conducted by California Resource Agencies and the U. S. Forest Service with the assistance of the University of California. (California Department of Fish and Game, March 16, 1963.)

Note: Under the Accelerated Public Works program, the Federal Government provides assistance for State projects in certain areas on a matching funds basis.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 63-2-Pelagic Fish (February 11 and 15, 1963): To determine the distribution and abundance of pelagic schools, the inshore area from the United States-Mexican Border to Point Conception was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

The first day's survey covered the area from the Los Angeles-Long Beach Harbor to Point Conception. Dense concentrations of red tide were observed in the harbor and as far northward as Point Dume. The inshore waters were quite turbid throughout the entire area, and visibility was good.

On February 15, the area from the Los Angeles-Long Beach Harbor to the United States-Mexican border was surveyed in the morning. Red tide was visible from the Harbor southward to Solaro Beach and, for the most part, extended to 1½ miles offshore. In most areas, the red tide was so dense that fish schools, if present, would not have been observed. Visibility was restricted by haze and some clouds. In the afternoon, the coastline from San Diego to Point Conception was reflown. Visibility was improved and two unidentified fish schools were noted off Del Mar in an area free of red tide. Red tide was seen as far north as Santa Barbara.

Adverse weather limited flying time to only 2 of the 5 days scheduled.

Airplane Spotting Flight 63-3-Pelagic Fish: The area between Point Reyes and the United States-Mexican Border was covered by an air survey conducted on March 12 and 13, 1963. Weather conditions for scouting were ideal both days. Visibility exceeded 15 miles at all times, wind velocities were low, and few clouds were encountered.

On March 12, the area from the United States-Mexican Border to Point Conception was surveyed. Nineteen anchovy schools were seen--7 off Point Mugu and 12 in the Goleta area. A total of 26 gray whales were seen moving north.

The red tide observed was even more extensive than in the previous month. Discolored water was noted from below the Border to Santa Barbara, mostly in a band extending from just outside the surf line to about three miles offshore. In places, it spread as far as five miles offshore. The fish schools noted at Point Mugu were in comparatively clear waters, although red tide was extensive in that area. The Goleta schools were in clear water. No fish schools were sighted between Point Reyes and Point Sal when the area was surveyed on March 13. Thirty-four gray whales were observed during the day. The water was clear except in the local area north of Santa Cruz where the inshore waters were discolored by river drainage.

Note: See Commercial Fisheries Review, February 1963 p. 20.

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RESEARCH GRANT FOR STUDY OF SQUID AND OCTOPUS:

The National Science Foundation has awarded a $29,000 research grant to the California Department of Fish and Game for a two-year study of squid and octopus. The study is expected to aid marine researchers by providing basic information on the part those cephalopods play in the food chains of many important ocean fisheries. A shellfish biologist of Redlands, Calif., who has made a lifelong study of squid and octopus, will be engaged to carry out the research project and to bring together present knowledge of squid and octopus. (California Department of Fish and Game, February 23, 1963.)

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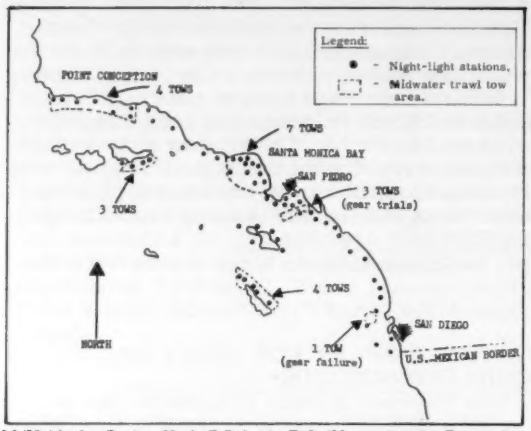
POPULATION DENSITY, DISTRIBUTION, AND AGE COMPOSITION OF SARDINES AND OTHER PELAGIC FISH SURVEYED:

M/V "Alaska" Cruise 62-A-7 (November 21-December 7, 1962): The coastal waters of southern California including those around the Channel Islands between Point Conception and the United States and Mexican border were surveyed by the California Fish and Game research vessel to determine the strength of the 1962 sardine year-class. Other objectives of the cruise were: (1) to determine the population density and distribution of the adult sardines; (2) to survey other pelagic species for distribution, abundance, and age composition; and (3) to continue testing a midwater trawl as a sampling device for pelagic species.

On the 62 night-light stations occupied, not one sardine (young or old) was sampled or observed. This cruise was, in number of pelagic fish species attracted to the light, one of the least successful surveys in this area during the past decade. Jack mackerel were sampled on 3 stations, anchovies on 3, and bonito on 2.



M/V Alaska Cruise 62-A-7 Pelagic Fish (November 21-December 7, 1962).

During 344 miles of night scouting, 88 fish schools were observed. Poor visibility hampered scouting in one-third of the area surveyed. Schools sighted were: anchovy 34; bonito 39; jack mackerel 5; and unidentified 10. In addition to the 39 bonito schools sighted, many small clusters (20 fish or less) were observed.

Although night-light stations were made in areas where anchovy schools were sighted, they tended to avoid the light. On three stations, anchovies were observed displaying a negative phototactic response. Some minutes after the vessel was on station with the light on, a fish school was detected on the fathometer trace. With subsequent dimming and brightening of the light, the school moved vertically through the water in response to manipulations. The brighter the light, the deeper the school moved and as the light was dimmed, the school approached the surface. When the light was extinguished, anchovies were observed "flipping" on the surface.

Although 21 tows were made, only 18 were used for comparing catches of the midwater trawl with those of the night-light blanket net method.

A parted bridle cable curtailed 1 tow and 3 tows were made to indoctrinate laboratory personnel in the midwater trawl's use. The 18 trawl tows were made in 5 widely separated areas in which 21 night light stations were occupied. Only small amounts of squid and saury were attracted on 5 of the 21 light stations. Catches by midwater trawl were predominately anchovy (about 10,000 pounds) plus 500-1,000 pounds each of jack mackerel, bonito, and squid. Only one sardine was captured in the 18 midwater trawl tows.

Although testing the midwater trawl as a device for sampling pelagic species is not yet complete, it is believed that it will prove to be an important adjunct to pelagic fish surveys.

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SALMON SPORT CATCH, 1962:

California sport fishermen took about 125,000 salmon in 1962 for their best year since 1956 when 176,000 were caught.

In 1962, sportsmen were aided by a regulation which allowed them to include 1 salmon under 22 inches in their 3 fish limit. About one-third of the salmon landed were under 22 inches in length.

Salmon were also in areas where skiffs and party boats could reach them in 1962. The range of those boats is limited and sport landings may fall substantially below the 100,000 mark even when fish are plentiful. This happened in 1961 when sportsmen landed only about 60,000 salmon, while commercial troll salmon fishermen were having their third best year in history.

Trollers on their way to fishing grounds.

Sport salmon fishing regulations for 1963 maintain the 3 fish limit in ocean waters and allow anglers to keep 1 fish under 22 inches but not less than 20 inches in length. (Outdoor California, February 1963.)

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SHRIMP RESOURCES IN SOUTHERN AND CENTRAL COASTAL WATERS SURVEYED:

M/V "Alaska" Cruise 63-A-1 (January 17-February 7, 1963): The objectives of this cruise by the California Department of Fish and Game research vessel Alaska off southern and central California from about Santa Barbara to Monterey were: (1) to conduct ex-

ploratory fishing for spot shrimp (Plandalus platyceros); (2) determine size, sex, and weight of shrimp from different areas; (3) use three different size and shape traps to determine fishing efficiency; (4) identify, count, and weigh all incidental species caught in traps; (5) make bathythermograph casts to obtain bottom temperatures at trap stations; and (6) run a series of gear trials with the gulf shrimp trawl and doors.

The shrimp taken in the Santa Barbara and Avila areas were placed in the live tank immediately after sexing and measuring. They were later transferred to the Menlo Park Laboratory for observation.

Samples of the shrimp taken in the Monterey area were sexed, measured, and weighed to determine heads-on count per pound. The catch was composed of almost equal

Area of operations of M/V Alaska during Cruise 63-A-1.

Shrimp traps were set in series' of 10 each at 10 stations off Coal Oil Point and Gaviota in the Santa Barbara area in 65 to 120 fathoms of water. Nineteen shrimp were caught in the 100 traps.

In the Avila area, traps were set off Point Arguello, Point Sal, and Point Buchon in 70 to 120 fathoms of water. Twenty-four trap stations yielded 16 shrimp. Seventeen tows with the Gulf shrimp trawl produced 106 srhimp.

In the Monterey area off Point Cypress and Point Lobos, shrimp were much more plentiful. Sixteen trap stations (156 traps) yielded 3,117 shrimp (heads-on); weighing 323 pounds; an average of 9.7 shrimp to the pound. Four tows with the Gulf trawl in Monterey Bay at 70 to 100 fathoms produced only three small shrimp.

numbers of males, transitionals, and females.

Heads-on counts ranged from 7.2 to 13.4 per pound. The mean carapace lengths for males, transitionals, and females were 37.0, 41.8 and 47.9 millimeters (1.46, 1.65, and 1.89 inches), respectively. Size, sex, and weight determinations were made for 100 shrimp. Practically all females were carrying eggs.

Three types of traps were used to determine fishing ability. The first was cylindrical and measured $3\frac{1}{2}$ feet long by 22 inches across. The second was rectangular, measuring 15 by 15 by 30 inches. Both of these were covered with 21 thread, $1\frac{1}{2}$-inch mesh netting. The third trap type, a rectangular one having the same measurements as above, was covered by .026 gauge fiberglass. The fykes on all traps were constructed of the same mesh net and had two openings of $3\frac{1}{4}$ inches.

Fishing was started with 50 traps--30 of the cylindrical design, 10 rectangular with mesh netting, and 10 rectangular with fiber glass covering. For comparing their fishing ability, they were fished alternately on a 10-trap string at each station. For example, to compare rectangular traps of netting with cylindrical traps, 5 of each were used and these were alternately snapped on the long-line. The same fishing design was used to compare rectangular traps of netting with fiber glass covered traps.

Loss of 5 fiber glass covered traps prevented a comparison with round traps. Salted rockfish carcasses were the most satisfactory baits. Sardines, squid, and unsalted carcasses were also used as bait but carnivorous amphipods quickly skeletonized them, especially in waters over 100 fathoms deep.

At 4 comparable stations in the Monterey area, cylindrical traps caught an average of 37 shrimp (3.7 pounds) each compared to 19 shrimp (2.0 pounds) each for the meshed rectangular traps. At 3 comparable stations, the meshed rectangular traps caught an average of 29.8 shrimp (3.7 pounds) each as compared to 14.7 shrimp (1.5 pounds) each for fiber glass covered rectangular traps. The cylindrical traps had the highest average catch per trap at one station with 81 shrimp. The meshed rectangular traps were next with an average catch of 55 shrimp per trap at another station. The best catch for the fiber glass covered traps was an average of 20.4 shrimp per trap at one station.

It appears the cylindrical traps fished the best. However, had the rectangular meshed traps been of equivalent size they may have fished as well. Trap size may be an important factor in fishing success.

In the Monterey area, traps were fished across contours of the canyons. The traps were first hooked on a 100-fathom mainline at 10-fathom intervals.

One hundred fathoms of additional line was played out to shallow water where a 100-pound anchor chain was set. The traps were generally set in 110 to 75 fathoms of water and the anchor at 50 to 60 fathoms. Number 12 solid braid polypropalene line was used for the mainline and buoy line.

In general, where shrimp fishing was the best, very few incidental species were encountered. Sablefish (Anoplopoma fimbria) was the most frequently caught in the traps in all areas. Off Point Lobos, in 34 traps, 38 sablefish weighing 58 pounds were caught. Individual sablefish measuring up to 23 inches and 2.5 pounds in weight were caught. Other fish included juvenile rockfish, sand dabs, and hagfish. Invertebrates include box crabs, decorator crabs, red crabs, starfish, whelks, sea hares, and octopi. Octopi were caught in all areas, with the largest weighing 16.5 pounds.

Bathythermograph casts were made in all areas where large and small shrimp were caught. At the Monterey trap stations, bottom temperatures ranged from 8.7° C. (47.7° F.) at 130 fathoms to 10.6° C. (51.1° F.) at 70 fathoms. The average of bottom temperatures was 9.6° C. (49.3° F.). The surface temperature ranged from 12.8° C. (55.0° F.) with an average of 12.9° C. (55.2° F.).

In beds of shrimp (Pandalus jordani), off Avila, bottom temperatures ranged from 8.0° C. (46.4° F.) at 128 fathoms to 9.7° C. (49.5° F.) at 105 fathoms. The average temperature was 8.9° C. (49.8° F.). The surface temperature ranged from 12.7° C. to 13.2° C. with an average of 12.9° C. (55.2° F.).

Trials with the Gulf of Mexico type shrimp trawl were successful. In the Avila area, exploratory tows were conducted for pink shrimp (Pandalus jordani). The gear consisted of a 41-foot head rope, 18-thread, $1\frac{1}{4}$-inch nylon mesh net, with $2\frac{1}{2}$ by 5 foot doors (160 pounds each), and a 25-fathom bridle. Towing was done by a single cable. A shrimp concentration was found off Point San Luis in 105 to 130 fathoms of water. The school measured approximately 7.5 miles long with an average width of 1.1 miles. Seven tows within the perimeter of this school produced an average of 165 pounds per 20-minute tow, a catch rate of 495 pounds per hour. Two tows yielded catches at the rate of 819 and 810 pounds per hour. Samples from each tow were sexed, measured, and weighed.

Their age composition was 11 percent 10 months old, 29 percent 22 months old, and 60 percent 34 months old. The latter group was composed almost entirely of females carrying eggs. Heads-on counts ranged from 43 to 108 per pound with an average of 57.

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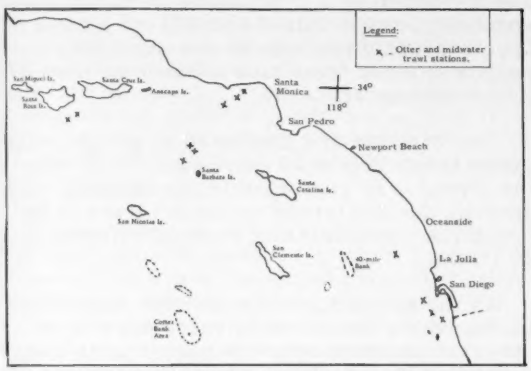
TRAWLING GROUNDS SOUGHT IN OFFSHORE WATERS:

M/V "N. B. Scofield" Cruise 63-S-1 (February 11-25, 1963): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield in the coastal waters off southern California between the Channel Islands and the United States Mexican border were: (1) to explore offshore areas for trawling grounds, and (2) to make ecological surveys of representative areas.



Area of operations of M/V N. B. Scofield during Cruise 63-S-1.

In each of 6 different areas, bottom trawling stations were sought in depths of 20, 50, 100, 250, and 500 fathoms. Midwater trawling was also planned at each station. All tows were for 30 minutes. During the cruise, fish and invertebrates were identified, enumerated, and measured. Samples of unidentified or unusual specimens were saved for scientists.

SANTA MONICA BAY AREA: Stations were occupied in 100, 250, and 440 fathoms. Gear difficulties limited the catch of bottom fish. English sole (Parophrys vetulus) predominated at 100 fathoms. Shortspined channel rockfish (Sebastodes alascanus), splitnose rockfish (Sebastodes diploproa), Dover sole (Microstmus pacificus), and sablefish (Anoplopoma fimbria) were taken in the 250-fathom bottom tow. No fish were caught in the 440-fathom bottom tow.

Good catches of lanternfish (family Myctophidae) and lightfishes (family Sternoptychidae) were taken in 2 of 4 midwater tows.

SANTA BARBARA ISLAND AREA: Stations were established in 80, 100, and 250 fathoms. All 500-fathom areas scouted by fathometer were rocky. Curlfin turbot (Pleuronichthys decurrens) was the main species produced by bottom tows at 80 and 100 fathoms. Shortspined channel rockfish, splitnose rockfish and blackgill rockfish (Sebastodes melanostomus) were most abundant in the deeper bottom tow. The deepest (125 fathom) midwater tow yielded a good catch of lanternfish.

Although no commercially significant catches were made in the area, much of it is suitable for trawling and further exploration might prove valuable.

SANTA ROSA ISLAND AREA: This area was scouted by fathometer for four days. Depths of 20, 50, 100, 250, and 500 fathoms were investigated. No trawable areas could be found. Two bottom tows were attempted at 50 fathoms; both resulted in badly torn nets.

CORTEZ BANK AREA: The area was scouted by fathometer for two days. No trawlable areas were found.

FORTY-MILE BANK AREA: The area was intensively scouted, but no trawlable areas were found.

SAN DIEGO AREA: Bottom trawls were made in 25, 50, 100, and 400 fathoms. At 25 fathoms, California halibut (Paralichthys californicus) and fantail sole (Xystreurys liolepis) were most abundant. The tow at 50 fathoms

California halibut (left eyed) (Paralichthys californicus)

included 185 pounds of English sole, 56 pounds of Pacific sand dabs (Cithanchthys sordidus), 59 pounds of California pompano (Palometa simillima), and 105 pounds of pink seaperch (Zalembrus rosaceus). In the 100-fathom bottom tow, greenspotted rockfish (Sebastodes chlorostictus) predominated. No fish were taken at 405 fathoms.

A significant catch was made in 1 of the 3 midwater tows. The productive tow was made at approximately 235 fathoms in 405 fathoms of water off La Jolla, Calif. It yielded a fine collection of bathypelagic fishes, including

lanternfishes, lightfishes, and deep-sea smelts (family Bathylagidae). Seventeen rare cephalopods, probably Vampyroteuthis infernalis were also taken in the tow.

Cans--Shipments for Fishery Products, January 1963

A total of 188,652 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January 1963, an increase of 3.2 percent from the 182,767 base boxes consumed during the same month in 1962.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (timplate) cans are derived by use of the factor 21.8 base boxes per short ton of steel. The use of aluminum cans for packing fishery products is small.

Central Pacific Fisheries Investigations

SKIPJACK TUNA RESPOND TO UNDERWATER SOUND:

Experiments to determine the range and threshold of underwater sounds that skipjack tuna can perceive, and also to determine their ability to discriminate between various underwater sounds are being conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu.

Experiments using 500-cycle-per-second (c.p.s.) underwater sound as a conditioning stimulus have demonstrated that skipjack (Euthynnus pelamis) perceive underwater sound. A skipjack has been trained to respond to the 500-c.p.s. sound by swimming directly to a feeding area in its home tank after it has been given the sound stimulus in another part of the tank. It swims to the feeding area about three times faster after the stimulus is presented than it does under control conditions (no sound stimulus).

The skipjack, which weighs about 5 pounds, is held in a circular swimming pool 23 feet in diameter and 4-feet deep. The pool has aluminum sides and is lined with a thin vinyl plastic sheet. An underwater loudspeaker is concealed at the end of a 10-foot long corridor through which the skipjack swims. A curtain of minnow netting suspended in the water forms the corridor. The 500 c.p.s. sound is produced by an audio signal generator, passed through a band pass filter to eliminate harmonics, and further amplified in an amplifier before being transmitted by the loudspeaker. Intensities are measured by a hydrophone from a Navy sonobuoy coupled into a sound level meter. Spectrographic analysis of the transmitted sounds is made from tape recordings played into a vibralyzer.

Experiments are conducted in groups, each group consisting of 20 individual trials when the stimulus is presented to the skipjack. One specific decibel (sound intensity) level of the 500-c.p.s. sound is tested during each group of 20 trials.

As the skipjack swims past the underwater loudspeaker, the observer (concealed in an observation tower over the pool) closes a key activating the speaker. The time required for the skipjack to reach the feeding area is then recorded. Each trial is preceded by a control, this being the time required for the skipjack to reach the feeding area from the position opposite the loudspeaker when no sound stimulus is presented. When it reaches the feeding area after responding to the stimulus, the skipjack is rewarded with a piece of food. It is not fed during controls. The time between sound stimuli is randomly selected and is from 1 to 3 minutes. Upon perceiving the sound, the skipjack makes a hard left turn and doubles back along the outside of the corridor to the feeding area. During controls the skipjack makes a more leisurely circuit around the tank's perimeter until it enters the feeding area.

The table shows some of the typical response times recorded for groups of trials at 500 c. p. s.

Average Time From Speaker To Feeding Area (Seconds)	
Sound Off	Sound On
9.5	2.8
9.1	2.8
10.4	2.9
8.5	3.1

Experiments thus far have shown that skipjack perceive underwater sound and that it will be possible to determine the range and threshold of underwater sound perception for skipjack and other related species with the techniques described and relatively inexpensive facilities.

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SKIPJACK TUNA SOUGHT EAST OF HAWAII:

M/V "Charles H. Gilbert: Cruise 63--Boundary I (January 10-March 2, 1963): No tuna schools were located during this cruise by the U. S. Bureau of Commercial Fisheries Honolulu-based research vessel Charles H. Gilbert. The "boundary" for which the cruise was named is the division between two important water types of the central Pacific, the California Current Extension, and the North Pacific Central water. Studies carried out around the Hawaiian Islands during the summer fishing season have indicated that skipjack tuna (aku) schools are numerous near this boundary. This cruise was aimed at discovering whether this was also true in winter, when the boundary lies in the vicinity of 150° W. longitude, about 450 miles east of the Islands.

Another purpose of the cruise was to collect specimens of blood for typing. Examination of the blood types could reveal whether the skipjack tuna found along the boundary in winter are members of the population which supports the Hawaiian summer fishery.

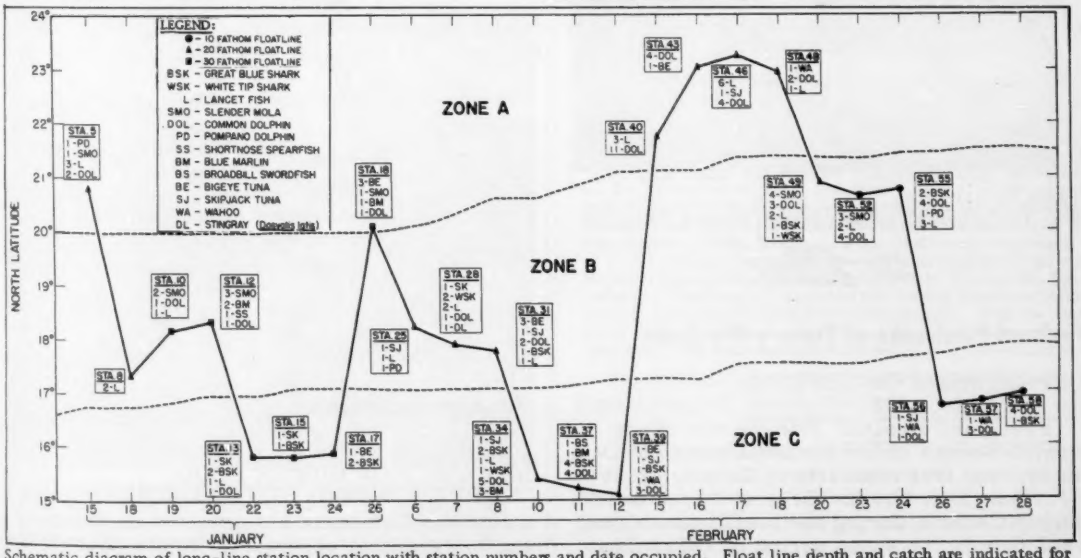
Fishing for skipjack tuna is generally done with pole-and-line and live-bait. However, because the area surveyed was so far from base and because of the duration of the cruise (almost 2 months), it was necessary to fish for skipjack with tuna long lines.

Long-line stations were located north of, south of, and in the boundary between the California Current Extension and the North Pacific Central water. The boundary was identified from surface salinity tests and isotherm plots made during the cruise. Three complete sections of temperature and surface salinity observations (at 30-mile intervals) were made across the study area. Several shorter sections were also made.

The spatial distribution of stations and catch composition are shown in the figure. The overall catch of selected species is given in table. Sixty baskets of 21-hook gear (1.5-fathom droppers, 1.0-fathom leaders, 4/0 hooks) were fished at all stations. Zone A stations were located north of the boundary, zone B stations in the boundary, and zone C stations south of the boundary. A total of 9 stations were occupied in both zone B and zone C, but only 6 long-line stations could be fished in zone A due to heavy seas. Some experimenting was done with float line length as indicated in figure.

Only nine skipjack tuna were caught in the study area. No bird flocks or schools of other tuna species were observed. Blood samples were taken from skipjack. All fish were measured. Gonads and stomachs were preserved from many of the fish.

Dolphin were quite common at all stations in the study area. Pompano dolphin (Coryphaena equiselis) were observed at stations



Schematic diagram of long-line station location with station numbers and date occupied. Float line depth and catch are indicated for each station. All stations are in proximity to 150° W. longitude. Lines separating zones are diagrammatic.

Number of Selected Species Taken at Longline Stations in Zones A, B, and C. Catches are Based on 6 Sets in Zone A, 9 in B, and 9 in C.

Zone	Whitetip Shark	Great Blue Shark	Lancetfish	Slender Mola	Common Dolphin	Blue Marlin	Bigeye Tuna	Skipjack Tuna
A	0	0	13	2	24	1	4	1
B	3	4	14	12	16	2	3	3
C	1	13	2	0	21	4	2	5

in zones A and B, but not in zone C. Pompano dolphin was easily differentiated from common dolphin (Coryphaena hippurus) while in the water by the former's lack of a yellow-pigmented caudal fin. Meristic counts were made on 90 common dolphin for comparison with 60 pompano dolphin which were taken with aku pole-and-line and subsequently preserved.

Other details of the cruise were:

1. Twenty-four 30-minute surface plankton tows were made.

2. A continuous record of surface temperature was maintained with the thermograph.

3. Canvas rafts which were attached to the end of the long-lines became waterlogged and sank after a few days.

4. Long-line depth was estimated with sounding tubes.

5. Blind chumming was performed on several occasions with no results.

6. Drift bottles and cards were released in the study area.

7. Ten nightlight stations were occupied.

8. In addition to trolling 2 surface lures at high speed between stations, 90 hours of approximately 5-knot trolling was performed. A total of 13 common dolphin, 1 pompano dolphin, and 2 small yellowfin tuna were taken by trolling.

Note: See Commercial Fisheries Review, February 1963 p. 23.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, 1962:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were purchased by the Defense Subsistence Supply Centers during the fourth quarter of 1962 than in the same period of 1961. The decline was 21.0 percent in quantity and 17.1 percent in value. For the year 1962, purchases were down 0.4 percent in quantity, but up 15.4 percent in value from those in the previous year. The increase in value was due to the purchase of higher-priced fishery products and an increase in the price of most fishery products in 1962.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, October-December 1962 with Comparisons

QUANTITY				VALUE			
Oct.-Dec.		Jan.-Dec.		Oct.-Dec.		Jan.-Dec.	
1962	1961	1962	1961	1962	1961	1962	1961
(1,000 lbs.)				($1,000)			
5,422	6,863	23,356	23,450	3,413	4,115	14,388	12,470

Canned: Purchases of canned fishery products for the use of the Armed Forces in the fourth quarter of 1962 were much greater than in the same period of 1961. In the year 1962, purchases of the three principal canned fishery products (tuna, salmon, and sardines) were up 4.7 percent in quantity and 12.3 percent in value from those in the previous year.

Table 2 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, October-December 1962 with Comparisons

Product	QUANTITY				VALUE			
	Oct.-Dec.		Jan.-Dec.		Oct.-Dec.		Jan.-Dec.	
	1962	1961	1962	1961	1962	1961	1962	1961
	(1,000 lbs.)				($1,000)			
Tuna	1,899	2,688	5,607	7,081	881	1,375	2,943	3,315
Salmon	2,279	-	3,295	1,403	1,160	-	1,798	893
Sardines	57	10	122	131	23	6	54	63

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

(2) See Commercial Fisheries Review, April 1963 p. 17.

Fishery Resources

THE SEA IS A GREAT UNTAPPED RESOURCE OF HUMAN FOOD:

The sea, with its vast untapped living resources, offers man his greatest challenge and his greatest opportunity in the quest to free the world from hunger, Secretary Stewart

L. Udall, U. S. Department of the Interior, said on March 21, 1963, in connection with the Freedom From Hunger Week proclaimed by President Kennedy.

National Freedom From Hunger Week, March 17-23, was especially appropriate because as part of the Freedom From Hunger Campaign the United States will be host to the World Food Congress in Washington, D. C., June 14-18, 1963. The United States, as a member of the Food and Agriculture Organization (FAO) of the United Nations, is participating with nearly 100 other countries in the FAO international drive against hunger. About 1,200 people will participate in the June conference.

Fig. 1 - Characteristics of tilapia fish shown to Thai fisheries representatives meeting at Bangkhen Experiment Station. Visiting expert Dr. S. Ling (center) is briefing provincial fisheries officers and village chiefs on distribution of fingerlings to Thai farmers, one of the steps in fish pond culture projects being advised by technical assistance experts of FAO.

Fig. 2 - The best way of overcoming the general lack of protein in the diets of the Far Eastern population is by increasing the production and consumption of fish. To that end the FAO organized a fisheries seminar in Djakarta in 1952 to which 18 nations of the region participated. This photograph shows breeding carp being put into baskets to be transferred to breeding ponds, at the Tjinindi fish-breeding farm, Java, Indonesia.

Fig. 3 - Thousands of people live from fishing along the coastal belt of Togo but their boats, equipment, and fishing methods are primitive and their catch is small. No mechanized fishing is yet practiced. Fish, however, is one of the most important sources of animal protein for the people of Southern Togo and the Government recently asked FAO to help improve the fishing industry. The former Director of the Fishing Service of British Guiana, was sent to Togo by FAO for this purpose. Fish are usually dried without cleaning and gutting, which reduces keeping qualities. The FAO expert demonstrates gutting to the fishermen.

In emphasizing the importance of Freedom From Hunger Week, Secretary Udall said:

"The United States has been uniquely blessed with its bounty of foods and it must exert world leadership in helping solve the food problems of the starving and malnourished peoples.

"While fishing for food has been one of man's means of existence since before the dawn of recorded history, we know little about the sea and its resources. We are approaching an era when man will harvest his food from the sea instead of hunting for it as he does now. Just as man moved from the land economy of hunting ages ago, and turned to a pasture and farm economy, so is he moving from an ocean economy based upon hunting for his food to a more productive and more certain way of obtaining food by managing the vast pastures of the sea."

The Secretary also quoted the President, who in a March 1961 message to the Congress, stated:

"The seas offer a wealth of nutritional resources. They already are a principal source of protein. They can provide many times the current food supply if we but learn how to garner and husband this self-renewing larder. To meet the vast needs of an expanding population, the bounty of the sea must be made more available. Within two decades our own Nation will require over a million more tons of seafood than we now harvest."

The Secretary said that fish protein concentrate (FPC) can contribute valuably to this program and emphasized the high priority the Department of the Interior is giving to developing this low-cost, high-protein fishery product. This has particular significance because one of the major items on the World Food Congress agenda is the role of fisheries in improving the nutritive diets of poorly fed people.

Frozen Foods

NEW LARGE SHIPPING CONTAINER DEVELOPED:

Two large United States companies have combined their abilities to give the frozen food industry a new, safer, and less expensive system for transporting foods that require regulated temperatures.

One of the firms has announced that it is ready to market a new, large, insulated shipping container that will protect frozen and other foods for long periods of time from outside temperatures. At the same time, the second firm said it is planning to offer different size trucks and tractor-trailers equipped with the new food containers to food handlers on a lease basis.

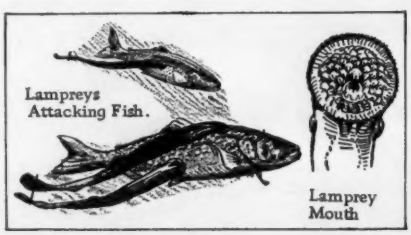
The system permits unitized shipment of frozen and other temperature-sensitive foods aboard flatbed trucks and trailers without mechanical refrigeration. The specially-insulated containers will hold foods near the temperature at which they were put inside the container for several hours. In recent tests, frozen foods were put into the containers at -5° F. and after 24 hours in summer heat, it was found the foods had undergone a temperature rise of only five degrees.

The system consists of a metal-covered box 95 inches long, 48 inches wide, and 85 inches high. Box-within-a-box construction is used with 3½ inches of polyurethane plastic insulation between the aluminum inner and outer shell. Ten units (holding up to 5,800 pounds) fit on a large flatbed semi-trailer truck. (Refrigeration Service and Contracting, January 1963.)

Great Lakes Fishery Investigations

RESEARCH VESSEL "SISCOWET" PROGRAM FOR 1963:

Assessing the abundance and distribution of young lake trout in Lake Superior will be the primary mission of the U. S. Bureau of Commercial Fisheries research vessel Siscowet in 1963. Quantitative measurements of hatchery-reared and native stocks become increasingly necessary during the early stages of sea lamprey control and lake trout rehabilitation. It is particularly important to determine when natural reproduction is reestablished.



The tentative cruise schedule of the Siscowet in 1963 is as follows:

Tentative Cruise Schedule of Siscowet in 1963		
Cruise	Period	Subject of study
I	May 6-17	Lake trout (gill nets)
II	June 3-14	Lake trout (trawl nets) Environmental survey
III	June 24-July 3	Lake trout (trawl nets)
IV	July 15-26	Lake trout (gill nets) Environmental survey
V	July 29-August 9	Isle Royale survey
VI	August 19-30	Keweenaw Bay survey
VII	September 9-20	Lake trout (trawl nets)
VIII	September 23-October 4	Lake trout (gill nets) Environmental survey
IX	October 14-25	Lake trout spawning
X	November 11-22	Whitefish spawning

Studies of the abundance and distribution of juvenile lake trout will be made from catches of experimental gill nets (cruises I, IV, and VIII) and trawl nets (cruises II, III, and VII) fished at various depths and locations in western Lake Superior. The gill nets and trawls will be systematically fished to provide information on the relative abundance of certain year classes and the seasonal distribution of the various size groups. Cruise IX will be devoted to the annual assessment of spawning populations of lake trout in the Apostle Islands region.

Environmental studies at three preselected limnological stations will also be made during cruises II, IV, and VIII. Special inquiry will be made into environmental factors which influence the seasonal depth and areal distribution of lake trout.

Cruises V (to Isle Royale) and VI (to Keweenaw Bay) will deal with the contribution of hatchery-reared lake trout to the native population and the relative abundance of small lake trout as compared to previous years. Some time will be spent in the Laughing Fish Point area investigating juvenile lake trout. Earlier work (1952-53) found young native lake trout most abundant in that region. Experimental fishing for chubs during cruise V may yield additional information on the identities of the various species.

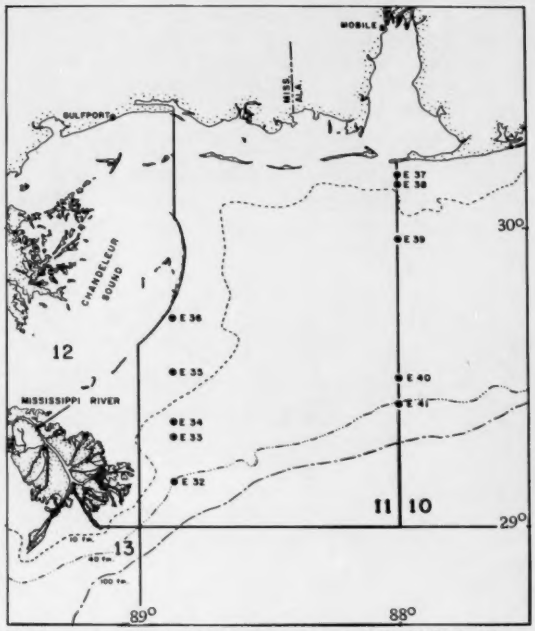
The annual assessment of spawning populations of lake whitefish will be continued during cruise X. Spawning fish will be tagged and released on the spawning grounds to learn more of their homing instincts.

The dates and activities of certain cruises during 1963 may be altered to meet changing needs.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-2 (February 19-March 11, 1963): Catches were generally poor during this cruise off the coast of Texas, Louisiana, and Mississippi by the chartered research vessel Gus III. The vessel (operated



New areas investigated during Cruise Gus-2 of the M/V Gus III (February 19-March 11, 1963).

by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries) was engaged in a continuing study of the distribution of shrimp in the Gulf of Mexico. The cruise extended the investigation into a new area east of the Mississippi River Delta.

Ten statistical areas (10, 11, 13, 14, 16, 17, 18, 19, 20, and 21) were covered. Because of poor weather, fishing was difficult at times. However, one 3-hour tow with a 45-foot shrimp trawl was made in depths of 0-10 fathoms, 10-20 fathoms, and over 20 fathoms in each of the areas. Hydrographic observations were made as scheduled.

East of the Mississippi Delta, catches were extremely light. Not more than 2 pounds of shrimp were taken in any 3-hour tow in statistical areas 10 and 11.

West of the Mississippi Delta, the best single catch per 3-hour tow was 39 pounds of 15-20 count brown shrimp from 10-20 fathoms in area 14. The same area yielded 7 pounds of 15-20 count brown shrimp from the over 20 fathom depth. Other areas yielded light catches of brown shrimp as follows: 16 pounds (31-40 count) from the 10-20 fathom range in area 19; 9 pounds (31-40 count) from 10-20 fathoms and 9 pounds (21-25 count) from over 20 fathoms in area 13; and 9 pounds (15-20 count) from the over 20 fathom depth in area 16. The catch of brown shrimp in other areas did not exceed 7 pounds.

The only area producing more than a scattering of white shrimp was area 20 which yielded 21 pounds of 51-67 count shrimp from the 0-10 fathom range, and 6 pounds of 21-25 count shrimp from 10-20 fathoms.

Pink shrimp were taken at only 4 stations. The catch in each case was less than 1 pound.

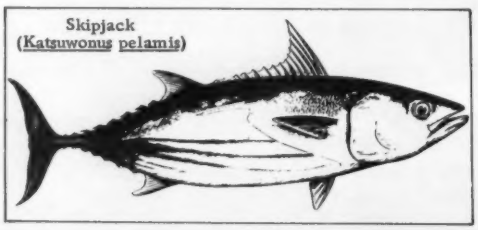
Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, April 1963 p. 18.

Hawaii

FISH AND SHELLFISH LANDINGS HIGHER IN 1961:

Landings of fish and shellfish in 1961 in the State of Hawaii totaled 14.5 million pounds with an ex-vessel value of nearly $3 million according to the U. S. Bureau of Commercial Fisheries. This was a gain of 3.4 million pounds (30 percent) in volume and $193,000 (7 percent) in value as compared with 1960.

Increased landings of skipjack tuna accounted for most of the increase. The gain



fulfilled predictions made by the Bureau biologists of a better than average year for skipjack landings. In 1961, the catch of skipjack averaged 6,000 pounds per trip, the fourth highest average catch per trip since 1952.

The Island of Oahu ranked first with a catch of 11 million pounds (76 percent). The Island of Hawaii was in second place with 1.9 million pounds, followed by Maui (1.3 million pounds). The remainder of the catch was landed at ports on the Islands of Kauai, Molokai, and Lanai. Tuna landings accounted for 86 percent of the quantity and 69 percent of the value of all fishery products landed in Hawaii.

The 1961 catch was taken by 589 fishermen. Fishing craft operated during the year included 65 vessels of 5 net tons and over, 195 motor boats, and 20 other boats.

Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January 1963: Based on domestic production and imports, the United States available supply of fish meal for January 1963 amounted to 20,780 short tons--7,379 tons (or 26.2 percent) less than during January 1962. Domestic production was 447 tons (or 16.4 percent) less and imports were 6,932 tons (or 27.3 percent) lower than in January 1962. Peru continued to lead other countries with shipments of 12,672 tons during January 1963.

U. S. Supply of Fish Meal and Solubles, January 1963 with Comparisons

Item	January 1/1963	January 1962	Total 1962
	.... (Short Tons)....		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	-	-	243,839
Tuna and mackerel	1,708	1,641	20,874
Herring	2/	2/	3,543
Other	577	1,091	41,744
Total production	2,285	2,732	310,000
Imports:			
Canada	2,905	2,587	42,806
Peru	12,672	20,082	186,249
Chile	2,918	1,157	9,247
So. Africa Republic	-	1,500	10,084
Other countries	-	101	3,921
Total imports	18,495	25,427	252,307
Available fish meal supply	20,780	28,159	562,307
Fish Solubles:			
Domestic production 3/	639	1,637	123,415
Imports:			
Canada	148	208	1,335
So. Africa Republic	-	-	1,717
Other countries	-	65	3,256
Total imports	148	273	6,308
Available fish solubles supply	787	1,910	129,723

1/Preliminary.
2/Included with "other."
3/50-percent solids. Includes production of homogenized condensed fish.

The United States supply of fish solubles (including homogenized fish) during January 1963 amounted to 787 tons--a decrease of 1,123 tons as compared with January 1962. Domestic production and imports dropped 61.0 percent and 45.8 percent, respectively.

* * * * *

U.S. FISH MEAL, OIL, AND SOLUBLES:

Major Indicators for U. S. Supply, February 1963: United States fish oil and fish solubles production in February 1963 was lower by 10.2 percent and 19.5 percent, respectively, as compared with February 1962. Fish meal production increased 25.8 percent.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, February 1963

Item and Period	1963	1962	1961	1960	1959
			(Short Tons)		
Fish Meal:					
Production 1/:					
April	-	6,311	6,179	5,076	6,810
March	-	2,495	2,751	2,955	2,122
February	2,600	2,066	2,071	1,923	2,128
January	2,285	2,732	2,723	2,443	3,095
Jan.-Dec. prelim. totals 2/	-	288,336	289,039	257,969	275,396
Jan.-Dec. final tots.	-	310,000	311,265	290,137	306,551
Imports:					
April	-	26,390	19,060	10,397	17,654
March	-	18,528	20,458	18,652	16,719
February	-	18,819	14,344	8,081	19,463
January	18,495	25,427	9,531	8,571	19,700
Jan.-Dec.	-	252,307	217,845	131,561	132,925
Fish Solubles:					
Production 3/:					
April	-	3,766	2,539	2,870	6,987
March	-	1,903	2,564	2,462	2,382
February	1,261	1,566	1,650	1,812	2,211
January	639	1,637	1,800	1,697	1,913
Jan.-Dec.	-	123,402	112,241	98,929	165,359
Imports:					
April	-	323	220	134	1,622
March	-	308	135	87	410
February	-	2,249	155	1,875	398
January	148	273	219	214	1,567
Jan.-Dec. totals	-	6,308	39	3,714	26,630
			(1,000 Gallons)		
Fish Body Oils:					
Production:					
April	-	652	439	248	436
March	-	42	63	66	42
February	44	49	44	51	38
January	55	93	55	46	64
Jan.-Dec. prelim. totals 4/	-	33,178	33,471	26,690	24,418
Jan.-Dec. final tots.	-	-	34,409	27,853	24,945
Exports:					
April	-	1,327	980	761	1,116
March	-	2,556	753	421	600
February	-	2,886	2,327	3,177	999
January	10	679	1,793	276	898
Jan.-Dec.	-	16,407	16,331	19,154	19,264

1/Does not include crab meat, shrimp, misc. meals.
2/Preliminary data computed from monthly data. Fish meal production reported currently comprised 90 percent for 1959, 89 percent for 1960, 93 percent for 1961, and 93 percent for 1962.
3/Includes homogenized fish.
4/Preliminary data computed from monthly data. Represents over 95 percent of the total production.
Note: Data for 1962 and 1963 are preliminary.

* * * * *

Production, January-February 1963: Preliminary data on U. S. production of fish meal, oil, and solubles for February 1963 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in table 1.

Table 1 - U. S. Production 1/ of Fish Meal, Oil, and Solubles, February 1963 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized 3/
	Short Tons	1,000 Gallons	Short Tons	Short Tons
February 1963:				
East & Gulf Coasts	622	7	118	-
West Coast 2/	1,985	38	1,143	-
Total	2,607	45	1,261	-
Jan.-Feb. 1963 Total	4,616	91	2,596	50
Jan.-Feb. 1962 Total	4,798	143	2,984	130

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes Hawaii, American Samoa, and Puerto Rico.
3/Includes condensed fish.

During January 1963 a total of 2,285 tons of fish meal and scrap and 54,654 gallons of marine-animal oils was produced in the United States. Compared with January 1962, this was a decrease of 447 tons or 16 percent in meal and scrap production, and a decrease of 38,282 gallons or 41 percent in oil.

Table 2 - U. S. Production of Fish Meal, Oil, and Solubles, January 1963 1/ with Comparisons

Product	January		Total
	1/1963	1962	1962
		(Short Tons)	
Fish Meal and Scrap:			
Herring	-	-	3,543
Menhaden 2/	-	-	243,839
Sardine, Pacific	6	455	743
Tuna and mackerel	1,708	1,641	20,874
Unclassified	571	636	19,337
Total	2,285	2,732	288,336
Shellfish, marine-animal meal and scrap	3/	3/	21,664
Grand total meal and scrap.	3/	3/	310,000
Fish solubles	760	1,597	112,764
Homogenized condensed fish	50	40	10,651
		(Gallons)	
Oil, body:			
Herring	-	-	666,503
Menhaden 2/	-	-	30,548,560
Sardine, Pacific	-	14,200	23,589
Tuna and mackerel	37,344	37,816	621,903
Other (including whale)	17,310	40,920	1,584,445
Total oil	54,654	92,936	33,445,000

1/Preliminary data.
2/Includes a small quantity produced from thread herring.
3/Not available on a monthly basis.

Tuna and mackerel meal amounted to 1,708 tons--accounting for 75 percent of the January 1963 meal total. Oil from tuna and mack-

erel (37,344 gallons) comprised 68 percent of the January 1963 oil production.

A total of 760 tons of fish solubles was produced in January 1963--less than half the production in January 1962. The production of homogenized condensed fish amounted to 50 tons--10 tons more than in January 1962.

Louisiana

SHRIMP AND OYSTER INVESTIGATIONS, 1962:

Highlights of the 1962 shellfish research and management program of the Louisiana Wildlife and Fisheries Commission were described in the March-April 1963 issue of the Louisiana Conservationist as follows:

Shrimp research in 1962 was greatly expanded. Weekly post larval and juvenile samples were taken throughout the year. Growth rates were established and the results when coordinated with hydrographic data furnished information needed for properly regulating the fishing season. Studies of the location and density of juveniles provided useful information for fishermen.

Both brown and white shrimp were successfully grown in experimental ponds. Mortality rates were lower than expected indicating that profitable production might be attained in ponds that were properly managed.

Management of oyster seed grounds involved shell plantings for cultch and the harvesting of seed oysters from Sister Lake on an alternate year experimental plan. Twenty-five thousand cubic yards of clam shells were planted as cultch in the Black Bay area of Louisiana. Seed oysters were found on over 80 percent of the planted shells. Production of seed and other type oysters from Sister Lake exceeded 23,000 barrels during September and October 1962. This reflects the success of the alternate year system of harvesting. Over-all setting of oysters on Louisiana's natural seed grounds in 1962 was the heaviest recorded in recent years, indicating excellent conditions for 1963.

Breaking up clumps of oysters from one of Louisiana's natural reefs.

Routine extension services to individual oyster growers were continued in 1962 at a level similar to past years.

Maryland

NEW DIRECTOR OF SEAFOOD PROCESSING LABORATORY APPOINTED:

The appointment of Dr. Mahlon C. Tatro as Director of the Seafood Processing Laboratory of the Natural Resources Institute, University of Maryland, was announced by the Institute on March 11, 1963.

Tatro received his doctorate in food technology from the University of Massachusetts. His previous experience includes positions with the United States Operations Mission, Santiago, Chile; a food products firm in California; and the Bureau of Laboratories, Vermont State Department of Health.

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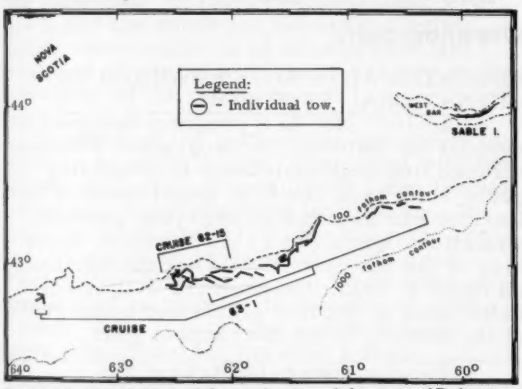
North Atlantic Fisheries

Exploration and Gear Research

STUDIES ON COMMERCIAL FISHING POTENTIAL OF OCEAN PERCH IN DEEP WATER OFF NOVA SCOTIA CONTINUED:

M/V "Delaware" Cruise 62 (December 3-11, 1962) and Cruise 63-1 (January 28-February 5 and February 12-21, 1963): The second and third in a planned series of cruises to explore the Nova Scotian section of the Continental Slope with emphasis on a search for commercial concentrations of ocean perch (Sebastes marinus mentella) were completed by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware on February 21, 1963. Such concentrations, nearer to home port, would permit commercial trawling in deeper waters than are now being fished and might provide supplemental areas for fishing during periods when weather conditions tend to restrict fishing effort or during periods when fish are scarce in other areas.

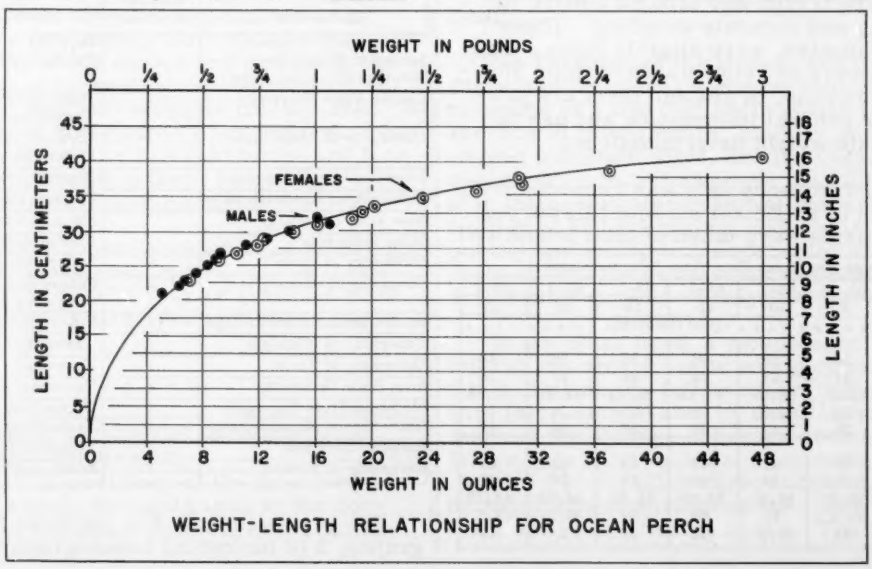


Cruises 62-15 and 63-1 of the exploratory fishing vessel Delaware.

During cruise 62-15, a roller-rigged "number 41" otter trawl net was used without ground cables but with 5-fathom legs. During cruise 63-1, a "number 41 redfish net" was used with both 5-fathom legs and 5-fathom ground cables.

During the two cruises, 45 tows, of 45-minutes duration each were made; all tows were timed from "hook-up" to "knock-out". Of the 45 tows, 37 were made within the depth range of primary interest (200-500 fathoms). Due to the generally uneven and precipitous nature of the slope bottom in this area, an additional 5 tows, which were made near the shoal limits of the depth range, extended into depths of less than 200 fathoms; 2 tows, which were made near the deeper limits of the range, extended into depths greater than 500 fathoms. One additional tow was made entirely in depths exceeding 500 fathoms.

Coverage in the area fished was generally uniform with one exception--during cruise 63-1 a nearly untrawlable area was omitted in order to obtain greater coverage during the limited periods of fishing weather available in this general area during this season. At


WEIGHT IN POUNDS
0 ¼ ½ ¾ 1 1¼ 1½ 1¾ 2 2¼ 2½ 2¾ 3
LENGTH IN CENTIMETERS
45 40 35 30 25 20 15 10 5 0
LENGTH IN INCHES
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
FEMALES
MALES
0 4 8 12 16 20 24 28 32 36 40 44 48
WEIGHT IN OUNCES
WEIGHT-LENGTH RELATIONSHIP FOR OCEAN PERCH

the end of cruise 63-1, three tows were made in the area where the best catch resulted during the first in this series of cruises (cruise 62-11); poor catches resulted - the best of the three was only about 290 pounds in 45 minutes of towing.

The best catches of ocean perch, taken during the two cruises, were made in the depth range of 250 to 300 fathoms with the uppper part of this range the most productive. Weight determination of all catches was made by volumetrically measuring the fish caught in bushel baskets and weighing one or more randomly-selected baskets of fish to determine the average (mean) weight per bushel; an extension of the mean weight, per basket, multiplied by the number of baskets gave the total estimated weight. The 4 best catches were all taken during cruise 63-1 and occurred on tows 10, 11, 14, and 23. The estimated weight of those catches was about 2,275, 2,950, 3,800, and 3,175 pounds, respectively. Bottom temperatures taken during these tows were, correspondingly, 5° C. (41.0° F.), 4.5° C. (40.1° F.), 4.75° C. (40.55° F.), and 5° C. The average (mean) weights of the perch taken during each of these tows are calculated to be 1.8, 1.7, 1.5, and 1.4 pounds respectively; the average (mean) lengths are correspondingly, 35.91, 35.57, 34.21, and 35.34 centimeters or approximately 14-1/8, 14, 13-1/2, and 13-7/8 inches. As length-weight information on ocean perch does not seem to be readily available, several bushels of fish were frozen and brought ashore for measuring and accurate weighing. These fish, as expected, were slightly lighter than the fresh, wet fish weighed aboard ship. However, the results, in graphic form are presented for general information and use in approximate weight determinations.

Length-frequency data was recorded from each catch of sufficient size for this purpose. Measurements were taken of total length and read to the nearest centimeter. The largest fish were taken on cruise 63-1, Tow No. 25; the smallest were taken on cruise 62-15, Tow No. 4. The data from those tows are presented in the table together with those from the 4 largest tows described in the preceding paragraph.

Length-Frequency Data from Selected Catches

Cruise No.	62-15	63-1	63-1	63-1	63-1	63-1
Tow No.	4	10	11	14	23	25
	(Centimeters)					
Males:						
Max.	36	35	35	33	39	48
Min.	21	32	28	25	27	36
Mean	25.21	33.00	31.14	29.13	33.36	41.08
Median	26	32.5	30	28.5	34	41
Mode	26	32	30	28	34	43
Females:						
Max.	31	41	43	41	42	49
Min.	21	30	30	27	28	39
Mean	29.84	36.30	36.68	35.52	36.07	43.78
Median	30.5	37	36	36	36.5	43.5
Mode	31	38.5	36	38	37	43

The largest fish measured was a female taken during Tow No. 25, cruise 63-1; this fish was 49 centimeters long (about 18-7/8 inches). The two smallest fish measured were male and female fish of equal length taken during Tow No. 4, cruise 62-15; these fish were about 21 centimeters long (8-1/4 inches).

Oceanography

EDUCATIONAL GRANTS AWARDED TO AID NATIONAL PROGRAM:

As another step in a program designed to support the National Oceanographic Program through financial assistance to promising young scientists, the U. S. Department of the Interior has awarded 21 two-year graduate educational grants to 17 universities, Secretary of the Interior Stewart L. Udall announced on April 3, 1963. Universities will select individuals to receive grants and begin studies at the opening of the next school year.

Educational Grants for 1963/64 School Year

Institution	Number of Grants	Field of Study
University of California (grants to Scripps Institution of Oceanography)	2	Physical Oceanography Biological Oceanography
Oregon State University	2	Physical Oceanography Technology
University of Washington	2	Physical Oceanography Fishery Biology
Johns Hopkins University	1	Physical Oceanography
University of Rhode Island	1	Physical Oceanography
New York University	1	Physical Oceanography
Duke University	1	Biological Oceanography
University of Hawaii	1	Fishery Biology
University of Miami (Fla.)	2	Fishery Biology Taxonomy
North Carolina State College	1	Fishery Biology
University of Michigan	1	Taxonomy
University of Texas	1	Taxonomy
Iowa State University	1	Taxonomy or Biometrics
Michigan State University	1	Technology
University of Massachusetts	1	Technology
Rutgers University	1	Technology
University of Florida	1	Economics

The grants include 6 in physical oceanography, 2 in biological oceanography, 4 in

fishery biology, 4 in taxonomy, 4 in fishery technology, and 1 in economics.

All tuition fees are paid for each student selected, and each will receive $3,000 for living expenses on a 12-month basis. Married students with children will receive an additional $1,000 family allowance. At the close of each academic year, the student's progress is reviewed before the second year of the grant is approved.

The grant program, the Secretary explained, began in 1962 in accordance with Congressional action. It is administered by the Bureau of Commercial Fisheries of the Fish and Wildlife Service to assist in developing the scientific manpower necessary in the expanding National Oceanographic Program and the needs for fishery biologists. Grants were made to 12 universities last year and 17 graduate students are now in the first year of the program.

Selection of the institutions to receive the grants was made by the Department with the advice of a panel of consultants from leading universities and research institutions. Invitations to participate in the program are sent to qualified educational institutions. Twenty-five institutions and 77 students were considered in the selections made in 1962. Twenty-eight institutions and 92 students were considered for the 1963 awards.

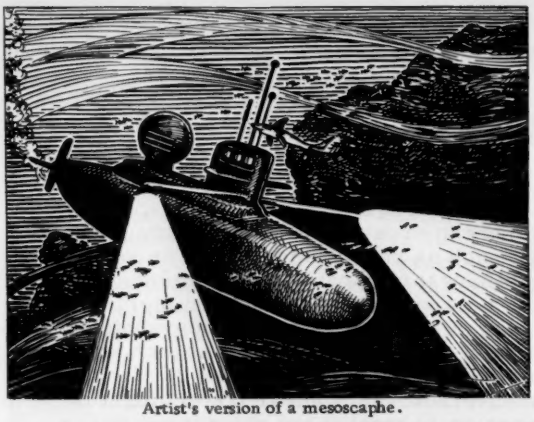
For eligibility under the grant program a student must have been graduated or is about to be graduated. He may then file with a university of his choice and designate the field in which he desires to continue his education. If that university is one selected for the grant, the student must then meet the qualifications set by that institution and face whatever competition there is by other students striving in the same field.

Most of the 17 students who are studying under grants awarded in 1962 are in their third, fourth, or fifth year of graduate work. Two are in their first year and three are in their second year.

* * * * *

FEASIBILITY STUDY OF RESEARCH SUBMARINE PROPOSED:

The U. S. Department of the Interior has proposed a study that could lead to the construction of a nuclear-powered research submarine, or mesoscaphe, to explore the deep frontier of the ocean. Such a mesoscaphe, which literally means "middle boat," could carry out studies on marine fishing and mineral resources, disposal of atomic wastes, national defense, and weather predictions, according to Secretary Stewart L. Udall, U. S. Department of the Interior. Biological, physical, and chemical oceanography are prime investigational areas for a research mesoscaphe, he said.



Artist's version of a mesoscaphe.

According to the Director of the Bureau of Mines, the submarine's mineral missions would include investigations of marine mineral resources such as coal, petroleum, and metals. It would probe the bottom of the sea by obtaining cores drilled from the ocean floor.

The Director of the Bureau of Commercial Fisheries noted that a mesoscaphe operating to depths of 1,000 feet could obtain important records of temperature, salinity, dissolved oxygen nutrients, light, and the vagaries of ocean currents. Techniques presently available for underwater observations are largely limited to SCUBA diving, underwater photography and television, underwater viewing ports in surface craft, and bathyscaphes which are usually capable of only vertical movement.

On the other hand, a mesoscaphe with its lateral movement, could scoop up various types of plankton, follow sonar-tagged fish with instruments, and, by using lights, study many of the strange undersea creatures now known only from museum specimens. Viewing ports would allow direct observation of bottom fish and shrimp on the Continental Shelf and on the fishing banks. The reactions

of fish to fishing gear and the effects of fishing vessel noise on fish could be studied.

The all-weather capability of a submerged craft would permit its use at all latitudes during stormy seasons.

The mesoscaphe, as visualized by scientists, would require a submerged speed of 20 knots in order to track and study large fish, such as sharks and tuna. The vessel would have to be capable of staying submerged as long as six weeks to allow uninterrupted studies of biological and oceanographic changes. The length of the research submarine would have to be less than 200 feet for maneuverability. Nuclear power might be necessary to meet those requirements.

The Department of the Interior has asked Congress for funds to carry out a feasibility study on the mesoscaphe. Hull and power plant design, construction features, type of undersea collecting gear, and crew training problems would be included in such a study.

The study was proposed as part of the National Oceanographic program which is being planned and coordinated by the Interagency Committee on Oceanography of the Federal Council for Science and Technology.

"We need better eyes in the sea, eyes comparable in power to those with which scientists are probing outer space," Secretary Udall said. "We need to apply our technological abilities to more intensive probing of inner space, the world ocean."

* * * * *

NEW RESEARCH AIDS FOR WOODS HOLE OCEANOGRAPHIC INSTITUTION:

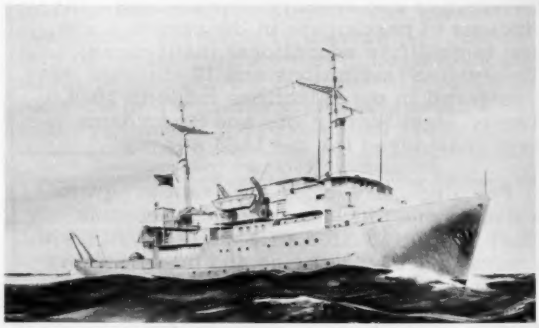
A converted four-engine C-54 airplane capable of taking scientists and equipment to any part of the world's oceans was to be delivered to the Woods Hole Oceanographic Institution, Woods Hole, Mass., late in the spring of 1963. The airplane was converted for science by an aircraft company in Miami, Fla., under grants from the Office of Naval Research and the National Science Foundation.

The C-54 will be operated by the Institution on a continuing loan from the Office of Naval Research. It will be used mainly for meteorological studies, but it will also be equipped for tracking scientific buoys, taking temperature readings, and geological and geochemical studies. Its normal complement will be a scientific party of 8 and a crew of 5. Its first major assignment will be to the Indian Ocean in May 1963, according to the Director of the Institution.

The airplane is part of a continuing development program aimed at providing maximum facilities for an expanding basic research program at Woods Hole, according to the Director.

The Director said the Institution was also acquiring the following major new facilities as part of the current development program:

A 210-foot research vessel, the Atlantis II which was scheduled for delivery late in January 1963. The modern oceanographic vessel will have a range of 8,000 miles. It has accommodations for a crew of 28 and a scientific party of 25. Costing around $4 million, the Atlantis II was built under a grant from the National Science Foundation.



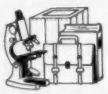
Artist's conception of the Atlantis II.

A 50,000-square foot biology and chemistry research laboratory now being erected in Woods Hole and scheduled for completion in the summer of 1963. It will provide space for about 150 investigators, as well as an auditorium seating 250 persons. The main source of funds for the new laboratory was a $2 million grant from the National Science Foundation.

A 99-foot research vessel, the Gosnold, which was converted from an Army cargo ship and delivered in December 1962. The Gosnold will be used principally for short cruises in local waters and along the continental shelf. It cost around $35,000 and was paid for from the Institution's private funds.

A 20-foot submarine, capable of diving 6,000 feet into the ocean, scheduled for delivery late in the summer of 1963. The underwater craft, accommodating a pilot and one scientist, is designed for scientific studies of currents, turbulence, temperature, salinity, sound velocity, and biology--principally along the continental shelf. It was financed by a $575,000 grant from the Office of Naval Research.

The Director said that those five major additions to the Institution's facilities, all within less than one year, should meet the needs of their scientific program for the immediate future. (Newsletter, January 31, 1963, United States National Oceanographic Data Center.)



Oregon

HATCHERIES MAINTAIN SPRING CHINOOK SALMON RUN IN THE MIDDLE WILLAMETTE RIVER:

Construction of the Lookout Point-Dexter hydroelectric facilities left the spring chinook run in the Middle Willamette River heavily dependent on Oregon fish hatcheries. During late summer and fall, as the spawning period approaches, there is a heavy drawdown of the Lookout Point pool. This causes water temperatures in the river to rise above 60° F. Incubation of spring chinook salmon eggs at such relatively high temperatures results in heavy egg mortality and a high rate of fry deformity.

Chinook Salmon

In 1955, the Oregon Fish Commission established a salmon trapping facility below Dexter Dam. Chemical treatment of adult salmon during the holding period, transfer of adults to holding ponds at the Willamette Hatchery near Oakridge, Ore., pasteurization of the salmon viscera used in fingerling food, and the development of the Oregon pellet for feeding fish have all contributed to a brighter outlook for the Middle Willamette run.

Approximately 1½ million yearling spring chinook were released in the Middle Willamette River in early 1963. Over 3 million young chinook are being reared for release during the early spring of 1964.

A record total of over 4½ million spring chinook eggs was taken from fish trapped at Dexter Dam during the 1962 season. The 2,193 adults trapped at Dexter in 1962 was slightly below the 2,240 annual average in the years since 1955. Despite the smaller number of returning salmon, more favorable water temperatures and improved disease control techniques resulted in higher survival of adults.

In the past, disease associated with warm temperatures during the fall took a high toll. Adult female losses at the Dexter collecting facility during the seven-year period between 1954 and 1960 ranged between 36 and 68 percent. The prespawning mortality of adult females was reduced to less than 7 percent during the last two seasons. (Oregon Fish Commission, March 25, 1963.)

* * * * *

NEARLY A MILLION YEARLING SILVER SALMON PLANTED IN ALSEA RIVER:

A total of 994,000 year-old silver salmon were released in the Alsea River in the first part of 1963 by the Oregon Fish Commission.

Silver Salmon

The young fish weighed 16 to the pound and averaged about 6 inches in length.

In earlier years, it was a common practice among fish culturists to release large numbers of fry shortly after hatching. But scientific investigation has indicated that rearing silver salmon to yearling migrant size leads to much higher survival rates.

A total of 6 million silver salmon eggs was taken at the Alsea Hatchery during the fall of 1962. The yield was well above the yearling rearing capacity of the station and helped supplement egg takes at other hatcheries. In

addition, 1,163 adult salmon were counted through the hatchery rack as they were allowed to pass upstream to spawn naturally. Large numbers of spawners also passed upstream uncounted during several periods of high water.

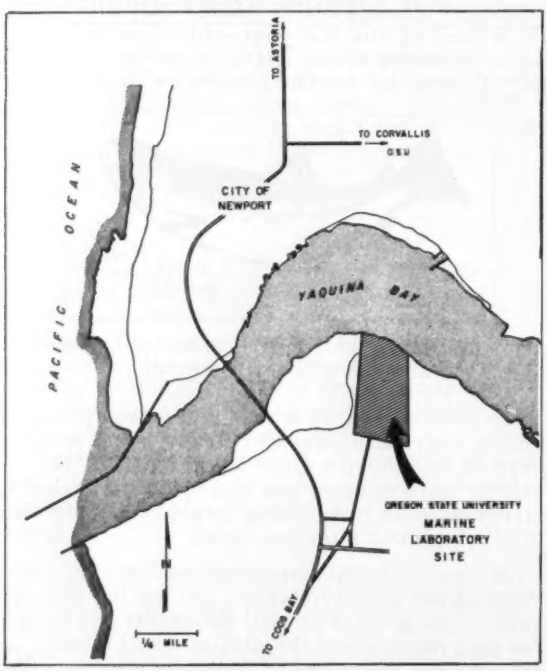
Since the liberation of 421,000 yearling silver salmon in 1961 formed the basis of last season's record Alsea run, the release in 1962 of 674,000 yearling silvers could mean an even heavier return during the fall of 1963.

The Alsea station appears to have contributed substantially to last year's good offshore silver salmon catch by commercial and sport fishermen, especially in the Newport-Waldport area. "This is an encouraging sign for the future indicating that, with modern fish cultural techniques, hatcheries can make a substantial contribution to the fishery," the Oregon Fish Commission's Director of Fish Culture said on April 1, 1963.

* * * * *

NEW MARINE SCIENCE LABORATORY WILL AID OCEANOGRAPHIC RESEARCH:

Construction is due to begin on the Marine Sciences Laboratory for Oregon State University. The laboratory will be located on Yaquina Bay just inside the harbor entrance. It will include docks and service facilities for the University's oceanographic vessels, and laboratory space and equipment for experimental work on marine organisms. There will also be a public aquarium and auditorium. The building, financed by a grant from the U. S. Area Redevelopment Administration, will be used by scientists in many phases of marine work, including oceanography.



Oceanographic work was begun at Oregon State in 1954 and expanded rapidly since the Department of Oceanography was formed in 1959. Research projects include studies of offshore water characteristics, currents and oceanic fronts; determination of bathymetry and analysis of sediments; inventories and ecological studies of marine life from bacteria to large fish and at all depths including the sea floor; chemistry and radio chemistry of sea water and marine organisms; and seismic and magnetic survey programs.

The early work was principally of a survey type. This phase is complete for some of the fields, as for example, the general study of physical and chemical properties and distributions of water masses. Papers on three aspects of this work are in preparation. Emphasis in physical oceanography is shifting to direct measurement of currents at all depths, the study of oceanic fronts, and examination of the effects of the weather, e.g. wind, on oceanic properties and circulation. The University will continue to sample a regular station pattern, however, to obtain data for time series studies.

Facilities in use include the R/V Acona, first vessel built for oceanographic research under the U. S. Navy's oceanographic research program. A four-story oceanography building will be built on the campus in Corvallis this year and is expected to be ready for occupancy by mid-1964. Most of the cost will be defrayed by a grant from the National Science Foundation, and about 25 percent of the funds will come from the State of Oregon.

The research program is accompanied and strengthened by graduate instruction. At present, 33 students are working toward graduate degrees in oceanography.

* * * * *

YEAR-OLD SILVER SALMON PLANTED IN COOS RIVER SYSTEM:

The release into the Coos River system of over 250,000 yearling silver salmon has climaxed the third year of activity at Millicoma Pond, the Oregon Fish Commission-Weyerhaeuser Company's cooperative salmon rearing impoundment in Coos County, the Commission's Director of Fish Culture reported on April 3, 1963.

Of the 262,000 yearling salmon reared in the eight-acre impoundment, 16,000 were transported by tank truck and released in upper South Coos tributaries. The balance of the fish were liberated into the East Fork of the Millicoma at the outlet of the pond. In May 1962, when the young silver salmon were placed in Millicoma Pond, they averaged about $2\frac{1}{2}$-inches in length. At the time of release the average length was close to 6 inches.

Millicoma Pond is a production facility, a part of the Fish Commission's hatchery system. This is in contrast with Wahkeena Pond, located just off the Columbia River Highway near Multnomah Falls, which is an experimental facility designed to investigate the feasibility of rearing salmon to release size without supplemental feeding. At Millicoma, hatcherymen have been feeding the Oregon pellet, the nutritionally complete food ration developed some years ago through the cooperative efforts of the Fish Commission and Oregon State University scientists.

The yearlings just released will make their way to the ocean within the next few weeks. Not all will survive to make the return trip back upstream. Predators will take a toll and many other mishaps will thin the ranks during the ensuing months. Both sport fishermen and offshore commercial trollers harvest Coos system fish over a

considerable reach of the ocean. Some of the young silvers will spend only 7 or 8 months in the ocean before returning as jacks in the fall of 1963. Most of the survivors, however, will remain in the sea for 19 or 20 months to return as adults during the fall of 1964.

Preservation

ULTRAVIOLET RADIATION TO REDUCE BACTERIA IN REFRIGERATED SEA WATER TESTED:

Investigation of the effectiveness of two ultraviolet units designed for reducing the bacterial population in grossly contaminated liquid media is under way at the U. S. Bureau of Commercial Fisheries Technology Laboratory at Gloucester, Mass. One unit is a commercial unit and the other is an improvised unit. Both units are located at the Massachusetts Shellfish Treatment Plant in Newburyport.

Preliminary data on a refrigerated sea water sample collected after ultraviolet radiation treatment indicates a definite reduction of bacteria. Successful application of this technique could be of great importance to fishing vessels using refrigerated sea water for preservation of the catch. This is because the increasing bacterial content of the cold recirculating sea water sometimes results in a reduction of the quality of the fish.

Salmon

PACIFIC SALMON INTERAGENCY COUNCIL ORGANIZED:

High level fisheries officials in the Northwest met in Portland, Ore., on March 28, 1963, and formally organized the Pacific Salmon Interagency Council. The Council's objective is to appraise current and future plans, needs, programs, and results in the field of salmon management and to coordinate salmon research. The Council is composed of State and Federal fishery administrators with a major responsibility for the management or study of Pacific salmon. The Council was formed pursuant to recommendations from the second Governors' Conference on Pacific Salmon which was held January 1963 in Seattle, Wash.

During the Portland meeting, the Director of the Oregon Fish Commission was elected chairman of the Council for the coming year. The Pacific Regional Director of the U. S. Bureau of Commercial Fisheries at Seattle was named vice-chairman, and the Executive Secretary of the Pacific Marine Fisheries Commission was elected permanent secretary.

The Council's bylaws provide for a technical committee composed of one fisheries scientist from each member agency. The primary responsibility of the committee of scientists is to develop a comprehensive program to insure an optimum sustained yield from the salmon resources of the Pacific Coast. The technical committee was instructed to (1) review and evaluate the report of the Second Governors' Conference on Pacific Salmon, (2) evaluate existing data and programs for duplication or omission, (3) determine information needed on a priority basis, and (4) submit a written report to the council. The scientists planned to begin working on their assignment immediately.

The seven state organizations represented on the interagency council are the Alaska Department of Fish and Game, California Department of Fish and Game, Idaho Department of Fish and Game, Oregon Fish Commission, Oregon Game Commission, Washington Department of Fisheries, and Washington Department of Game. Federal agencies represented include the Office of the Commissioner, U. S. Fish and Wildlife Service; Bureau of Commercial Fisheries, Pacific Regional Office and Alaska Regional Office; Bureau of Sport Fisheries and Wildlife, Pacific Regional Office; and Corps of Engineers, North Pacific Division.

Note: See Commercial Fisheries Review, February 1962 p. 48.

Scallops

CANADIANS JOIN WITH NEW BEDFORD PRODUCERS IN PROMOTIONAL PROGRAM:

The New Bedford (Mass.) Seafood Council, promotional organization of the New Bedford sea scallop fishing fleet, has announced that the Canadian scallop industry has joined in its United States program of advertising and public information.

Negotiations for joint promotion in the United States have been under way since the spring of 1962. Canadian buyers and packers of scallops will be the contributors to the program which formerly has been supported solely by funds from New Bedford vessel owners and crews.

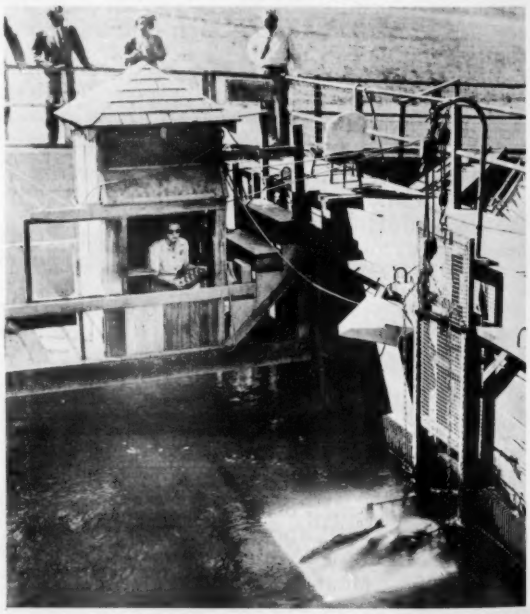
It is expected that the Canadian participation will add about $15,000 to the Council's advertising budget for 1963. This will permit expansion of the present program which involves an annual budget of approximately $70,000. It will enable the Council to seek out markets heretofore unexplored and strengthen areas that have been underexploited for budgetary reasons.

In the past few years imports of Canadian scallops have shown a sharp increase. In 1962, scallop imports from Nova Scotia dealers amounted to a new high of over 11 million pounds of scallop meats. New Bedford scallop vessels landed about 19 million pounds of scallop meats. The United States market was able to absorb both the domestic production and the Canadian imports at relatively profitable price levels.

Shad

COLUMBIA RIVER RUN INCREASES:

A total of 94,000 American shad was counted passing Bonneville Dam in 1960. The count jumped to 265,000 in 1961, and then to 417,000 in 1962, according to the Executive Director of the Pacific Marine Fisheries Commission. He suggested that the increasing size of the shad run in the mid-Columbia River may be due to ecological changes in the



Counting station on Bradford Island (on Columbia River) fish ladder.

river caused by the construction of The Dalles Dam. The bulk of the shad migration has been observed between the dams at Bonneville and The Dalles. No shad were counted over Rocky Reach Dam in 1962. The Washougal reef below Bonneville is a famous shad spawning area.

Shad were transplanted in western rivers from the East Coast. They migrate to the ocean and come back to spawn more than once. In the Sacramento River, which supports an active shad sport fishery, they reach a size of 24 inches and a weight of around six pounds.

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SUSQUEHANNA RIVER STUDY PROPOSED:

A $2\frac{1}{2}$-year study on the possibility of restoring shad runs in the Susquehanna River was proposed on April 4, 1963, by an administrative committee composed of representatives from the U. S. Fish and Wildlife Service and the States of Maryland, New York, and Pennsylvania. The suggested study, which was designed by a special technical committee, called for biological investigations to determine the advisability of constructing fishways at dams along the Susquehanna.

Features of the plan include hatching studies on 2 million shad eggs in 1963 and 1964. The eggs would be studied in floating hatching boxes at Falls on the North Branch of the Susquehanna River, at Sunbury and Clarks Ferry on the main river, and at Lewistown on the Juniata River, all in Pennsylvania. Research would include bioassays to determine the effects of environmental factors upon the early stages of shad development.

Some 50 million fertilized shad eggs from the Columbia River on the Pacific Coast would be planted in the Susquehanna River during the summer of 1963 and 1964 to provide young fish for studies of downstream migrations. Young shad spend their first summer in rivers and then migrate to sea in the fall. Stations would be set up at York Haven, Safe Harbor, Holtwood, and Conowingo dams to capture young shad and measure their downstream movement.

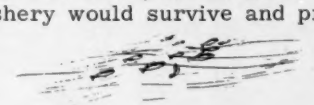
In another phase of the study, some 2,000 adult shad would be released above Conowingo and York Haven dams. Each year, 500 of the adult fish would be marked with tags, including a recently developed sonic tag by which the movement of fish can be traced electronically. Fishermen who catch the adult tagged fish would be asked to report their catch so that the movement of the fish could be recorded.

Action to develop a means of financing the project was to be undertaken with the hope that actual work on the Susquehanna River could be started in April 1963. Biologists from Federal and State agencies would comprise the study force.

Development of the plan followed a 1962 study financed by the State of Pennsylvania that indicated it would be possible to design and construct a series of fishery structures at the power dams along the river which would allow upstream migration by shad and other fish species.

The possibility of redeveloping a run of shad on the Susquehanna has aroused considerable interest among fishermen and others, who recall the successful reestablishment of shad in the Connecticut River above Holyoke, Mass. State and Federal fishery biologists hope such a program could also be successful on the Susquehanna River, but evidence is yet insufficient to justify the substantial investment necessary to construct the fishways.

Although the earlier studies demonstrated the engineering feasibility of designing structures at the Susquehanna dams, additional data are needed about upstream conditions of the river, and whether a new shad fishery would survive and prosper.



Shrimp

UNITED STATES SUPPLY AND DISPOSITION, 1959-1962:

The available United States shrimp supply in 1962 was 11.2 percent greater than in 1961, but 1.5 percent below the supply in 1960. Although shrimp imports were at a record level in 1962, domestic landings were up only 9.2 percent from the low level of 1961.

Vessel unloading catch of shrimp at wharf.

U. S. Supply and Disposition of Shrimp, 1959-62				
Item	2/ 1962	1/ 1961	1/ 1960	1/ 1959
	(1,000 lbs.)			
Supply--Heads-on Weight:				
Domestic Landings	190,600	174,494	249,452	240,182
Foreign product of U. S. fisheries 3/	716	-	-	-
Imports 4/	240,738	213,957	189,431	177,610
Total supply (heads-on)	432,054	388,451	438,883	417,792
Disposition--Heads-on Weight (Approximate):				
Frozen:				
Headless 5/	6/	238,901	278,535	247,649
Meat, raw (includes some cooked) 5/	6/	81,107	76,933	53,805
Meat, cooked 5/	6/	8,114	8,985	5,918
Breaded	6/	74,717	72,049	69,980
Specialities	6/	574	583	363
Total frozen 7/	331,881	318,428	338,653	317,464
Canned	59,547	41,484	51,900	53,939
Dried	3,506	4,499	6,330	3,389
Fresh	30,000	24,000	42,000	43,000
Unclassified	7,120	40	-	-

1/Revised.
2/Preliminary.
3/Caught by domestic craft, principally in waters off Central America, and shipped to the United States. Reported by the U. S. Bureau of the Census as "Products of the American Fisheries."
4/The total quantity of all types of shrimp imports (fresh, frozen, cooked, dried, canned, etc.) was reported by the U. S. Bureau of the Census as follows: 1959--106,555; 1960--113,418; 1961--126,268; and 1962--141,384 pounds. The equivalent heads-on weight was computed.
5/May include some fresh products.
6/Not available.
7/The totals do not add and and are less than actual totals because products frozen more than once have been eliminated.

Notes: (1) Shrimp data were compiled from figures assembled by the U. S. Tariff Commission and the Bureau of Commercial Fisheries. To convert the weight of heads-on shrimp to heads-off, divide by 1.68.

(2) See Commercial Fisheries Review, June 1962 p. 34.

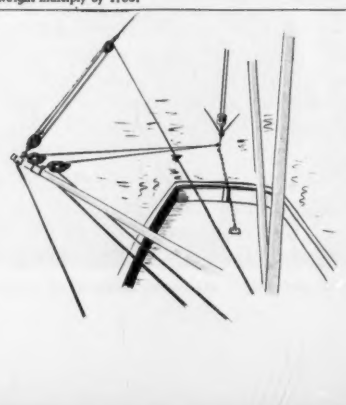
* * * * *

UNITED STATES SHRIMP SUPPLY INDICATORS, MARCH 1963:

Item and Period	1963	1962	1961	1960	1959
	(1,000 Lbs., Heads-Off)				
Total landings, So. Atl. and Gulf States:					
May	-	6,151	5,276	6,335	6,885
April	-	3,349	3,171	4,728	3,595
March	3,700	3,317	4,754	4,099	2,950
February	3,920	4,125	3,910	3,784	3,227
January	4,000	3,828	5,686	5,402	4,308
January-December	-	105,100	91,396	141,035	130,660
Quantity canned, Gulf States 1/:					
May	-	1,794	1,208	1,461	2,461
April	-	12	9	66	74
March	50	86	35	117	85
February	280	241	90	204	124
January	570	492	183	266	283
January-December	-	23,210	14,500	26,394	22,659
Frozen inventories (as of end of each mo.) 2/:					
May 31	-	13,904	24,696	17,540	21,137
April 30	-	15,637	27,492	20,502	23,331
March 31	3/	16,607	31,345	23,232	24,893
February 28	4/ 27,597	19,012	37,612	29,063	27,555
January 31	4/ 28,487	21,328	37,842	34,332	30,858
January 1	31,577	19,755	40,913	37,866	32,844
Imports 5/:					
May	-	11,221	8,278	9,902	8,264
April	-	10,219	9,208	7,733	9,051
March	3/	9,658	10,347	8,545	8,492
February	12,100	10,599	8,932	7,657	7,481
January	13,139	12,907	12,338	8,596	8,238
January-December	-	141,384	126,268	113,418	106,555
	(¢/lb., 26-30 Count, Heads-Off)				
Ex-vessel price, all species, So. Atl. & Gulf Ports:					
June	-	84.4	53.7	64.1	60.7
May	-	83.7	52.8	62.9	63.3
April	-	82.2	55.4	60.6	65.2
March	6/ 85-92	80.9	56.0	56.3	67.6
February	6/ 83-93	78.9	53.5	51.8	69.6
January	6/ 82-90	76.3	52.5	49.4	70.9
Wholesale price for froz. domestic brown species (5-lb. pkg.) at Chicago, Ill.:					
June	-	102-104	67-72	76-77	73-74
May	-	96-103	67-69	74-77	70-76
April	-	94-97	69-70	74-75	75-82
March	102-106	94-95	69-71	65-68	81-83
February	102-106	93-95	69-71	65-67	82-87
January	102-106	91-94	69-71	64-66	86-88

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3. The figures in the section (Quantity canned, Gulf States) have been completely revised beginning with February 1963 on the basis of a new conversion factor (formerly 33.0 pounds per case).
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Not available.
4/Inventory of Jan. 31, 1963, includes 397,000 pounds and inventory of Feb. 28, 1963, includes 957,000 pounds for firms not reported previously.
5/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
6/Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Texas, only.

Note: Data for 1963 and 1962 are preliminary. March 1963 data estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.



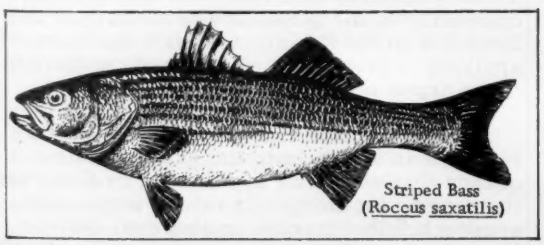
Striped Bass

TAGGING PROJECT HELPS ESTIMATE CHESAPEAKE BAY ABUNDANCE:

A total of 3,100 striped bass (rockfish) were tagged and released in Chesapeake Bay between Annapolis and Solomons, Md., during early January, 1963, in a joint study by the Maryland State Chesapeake Biological Laboratory at Solomons and the U. S. Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N. C. About 12 percent of the tagged fish had been recaptured by the end of February by cooperating fishermen. The returned tags will be useful in estimating the size of the rockfish supply in upper Chesapeake Bay during late winter.

The tagging program is part of a larger cooperative striped bass study designed to pinpoint the utilization, movements, and other aspects of the biology of the species during the rest of the year. This is the second year that biologists from the two agencies have worked closely in northern Chesapeake Bay.

State and Federal biologists began their estimation studies of striped bass populations in the Potomac estuary in 1959. They were continued during 1960 and 1961. The studies are limited to small fish that are 2 and 3 years old, because that group makes up most of the sports and commercial catch of striped bass. Numerical estimates of sublegal size fish and older fish larger than about 17 inches are not included. The Chesapeake Biological Laboratory has started a separate study to forecast hatches of striped bass by taking winter samples of the young fish.



Striped Bass
(Roccus saxatilis)

The results of the population studies cannot be applied to management purposes as yet. Techniques are being subjected to further critical studies. The Director of the Maryland Natural Resources Institute said, "Attempts are being made to insure the earliest possible application of these findings to the best management of striped bass in Maryland. Reliable knowledge of the number of striped bass present early in the fishing season is of enormous value to everyone. . . . It will contribute to wise decisions by management authorities on the quantity of fish which should be taken each year, and to the best distribution between netter and angler catch."

Swordfish

LONG-LINING OFF NEW ENGLAND SUCCESSFUL IN 1962:

The beginning of a new fishery to New England was indicated on August 13, 1962, when the large trawler Gulf Stream, operating out of Portland, Me., landed at Portland with 6 swordfish. It was the first swordfish ever caught by long line commercially and landed at a United States port. The vessel had also been harpooning and caught 35 swordfish by that method on the trip. On September 17, the same vessel landed 119 swordfish at Boston that were caught by long line. Shortly thereafter, the medium trawler Cap'n Bill III also began long-lining for swordfish, landing most of its catch at Woods Hole. By the end of 1962, those two vessels had made a total of 10 trips and landed 1,056 swordfish weighing 150,800 pounds (see table). About 366 tuna weighing 53,900 pounds were also caught by those vessels. The Cap'n Bill III continued fishing into January 1963.

Unloading dressed swordfish from long-liner Cap'n Bill III.

The vessel Gulf Stream made its first trips with the technical assistance of the U. S. Bureau of Commercial Fisheries Exploratory Base at Gloucester, and as a result of earlier explorations by Bureau scientists and the Woods Hole Oceanographic Institution. The Cap'n Bill III was chartered by the Woods Hole Oceanographic Institution on its first trip and also received technical assistance from the Bureau. A small trawler from Point Pleasant, N. J., also made a few long-line trips for swordfish which were landed at that port.

Swordfish and Tuna Long-Line Trips Landed at New England Ports, 1962[1]

Date Landed	Port Landed	Swordfish		Tuna	
		No. Fish	1,000 Lbs.	No. Fish	1,000 Lbs.
Aug. 13[2]	Portland	8	1.8	-	-
Sept. 17	Boston	119	23.0	4	0.5
Oct. 16[3]	Woods Hole	17	3.4	32	4.2
Oct. 17	Portland	105	21.0	-	-
Nov. 1	Woods Hole	99	14.8	148	25.0
Nov. 15	Woods Hole	94	10.7	65	10.9
Dec. 2	Woods Hole	83	11.5	36	5.0
Dec. 4	Newport (R.I.)	88	13.0	37	3.9
Dec. 20	Woods Hole	366	36.6	44	4.4
Dec. 21	Portland	77	15.0	-	-
Total.		1,056	150.8	366	53.9

1/Preliminary.
2/35 additional swordfish caught by harpoon.
3/Experimental trip chartered by Woods Hole Oceanographic Institution.

The normal swordfish season in the western North Atlantic extends from late June to early October when fishing is conducted by harpooning. Most of the harpooning is done on Georges Bank when swordfish are available during the warm weather. Long-lining allows vessels to follow the swordfish on their apparent southward migration to the edge of the Gulf Stream. The late-season trips in 1962 were made to that area.

The long-line method of catching swordfish is not new. The Japanese have caught swordfish with long-line gear incidental to tuna long-line operations. The Cubans have had a long-line fishery for many years. Also, the Canadians in 1962 modified halibut long-line gear to fish swordfish on North Atlantic grounds. A Norwegian long-line trawler also caught swordfish on Georges Bank in 1962 while fishing for mackerel shark.

Most of the long-line caught swordfish was shipped and handled fresh on the Boston wholesale market. The appearance of fresh swordfish in November and December was completely new to dealers who would normally be handling only the frozen product at that time. Fresh swordfish moved at fairly high prices because the demand was very good.

Considerable interest in this new fishery has been indicated by vessel owners and dealers in New England. A number of vessels at New Bedford and Gloucester began outfitting with long-line gear, or planned to do so. How important the fishery will eventually become cannot be forecast at this time. Several key factors, such as the extent of the resource in the waters off the coast and the damage done by sharks during the summer, are largely unknown. Continued fishing in the immediate future will no doubt supply some of the answers.

--John J. O'Brien
Supv. Market News Reporter
Fishery Market News Service
Boston, Mass.

Transportation

FISHERIES AND FARM ORGANIZATIONS SUPPORT REMOVAL OF BULK COMMODITY MINIMUM RATE REGULATIONS:

Twelve national organizations, representing a major portion of the nation's farmers, fishermen, and allied distribution industries have joined in support of the Administration's March 5, 1963, recommendation to Congress for removal of minimum rate regulations on the transportation of agricultural (includes fishery products) and bulk commodities. These organizations, however, voiced united opposition to the possible alternative, as referred to in the Administration's message, of applying regulation to all surface carriers in those areas presently exempt.

"Although there may be some honest differences in views as to the detailed safeguards that should be spelled out by Congress in adopting the minimum rate deregulation approach," the group's spokesman stated, "we have no differences in our policy positions that less regulation of railroads and not more regulation of motor and water carriers in these areas will promote a stronger national transportation system and be in the best interest of shippers and the public generally."

Experience has demonstrated that products from farms and fishery products cannot be

distributed to the consumers in the cities, towns, and rural areas throughout the country economically and efficiently under a system of Federal control.

"It is ironical that those modes of transportation which have made the greatest gains and progress in the past two decades under a regulatory policy which grants to those modes exemption from economic regulation in transporting agricultural and bulk commodities, now vigorously oppose extension to the railroads of a comparable freedom from regulation," the group's spokesman added. "This is an issue of grave concern to all of agriculture as well as to other shippers and the public generally and in our opposition to any narrowing or repeal of the agricultural or bulk commodities exemptions, we stand united." (United Fresh Fruit and Vegetable Association, Washington, D. C., March 20, 1963.)

Tuna

GOOD SKIPJACK TUNA SEASON FORECAST FOR HAWAII IN 1963:

A better than average 1963 summer catch of skipjack tuna in Hawaiian waters has been forecast by the U. S. Bureau of Commercial Fisheries Biological Laboratory in Honolulu.

The prediction of the availability of skipjack tuna to Hawaii's fishermen is based on the warming rate of the ocean's surface water in the spring. Oceanographic studies have indicated that the earlier in the year the ocean begins to warm up, the better will be the catch of skipjack in the ensuing summer fishing season.

This year, the waters off Koko Head on the Island of Oahu began to show a temperature upturn in the first part of February, one of the earliest changes on record. That development was checked against the seasonal change in the salt content of surface water. As this indicator also showed an early change, scientists are expecting a good year for the local tuna industry.

Knowledge of the life history of the skipjack tuna is still insufficient to enable oceanographers and biologists to explain exactly why the relation between water temperature changes and the skipjack catch is so consistent. They have found, however, that the relation has held over the past 10 years, which is as long as suitable records of ocean temperature changes have been kept in Hawaii. It is thought that the skipjack schools move into the Hawaiian area with the seasonal movement of certain types of central Pacific waters, such as the boundary between the California current extension and the north Pacific central water.

Although the ability to predict catches is one of the major goals of fishery science, dependable forecasting techniques are still to be worked out for most of the world's fisheries. It is not yet possible to predict with certainty the exact level of Hawaiian skipjack landings, but there is a considerable practical value in even a general pre-season forecast. Such knowledge enables processors and distributors to regulate their alternate sources of raw material and to buy appropriate supplies. It also lets the fishermen know in advance what sort of return may be expected from their investment in fishing gear and equipment.

U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, FEBRUARY 1963:

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, February 1963 with Comparisons

Area (Home Port)	Feb. 1963	Feb. 1962	Jan.-Feb. 1963	Jan.-Feb. 1962	Total 1962
	(Number)				
Issued first documents 2/:					
New England	2	-	3	2	28
Middle Atlantic	-	-	1	-	3
Chesapeake	3	2	3	6	43
South Atlantic	5	2	7	4	47
Gulf	11	5	23	15	110
Pacific	5	6	9	12	130
Great Lakes	-	-	-	-	5
Puerto Rico	-	-	-	-	2
Total	26	15	46	39	368
Removed from documentation 3/:					
New England	1	3	2	5	24
Middle Atlantic	6	1	10	9	39
Chesapeake	2	1	3	3	23
South Atlantic	3	4	10	7	38
Gulf	5	6	10	19	104
Pacific	8	11	15	27	111
Great Lakes	-	1	2	6	22
Hawaii	-	-	-	1	3
Puerto Rico	-	-	-	-	1
Total	25	27	52	77	365

1/For explanation of footnotes, see table 2.

During February 1963, a total of 26 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 15 in February 1962. There were 25 documents cancelled for fishing vessels in February 1963 as compared with 27 in February 1962.

Table 2 - U. S. Fishing Vessels--Documents Issued and Cancelled, by Tonnage Groups, February 1963

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	6	7
10-19	9	6
20-29	-	3
30-39	1	5
40-49	1	1
50-59	-	1
60-69	1	-
70-79	2	-
80-89	1	-
100-109	-	1
110-119	1	-
140-149	4	-
190-199	-	1
Total	26	25

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes 1 redocumented vessel in February 1963 previously removed from records. Vessels issued first documents as fishing craft were built: 7 in 1963; 7 in 1962; 1 in 1961; 2 in 1960, and 9 prior to 1951.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

* * * * *

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, JANUARY 1-MARCH 31, 1963:

From the beginning of the program in 1956 through March 31, 1963, a total of 1,249 applications for $34,341,496 have been received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. Of the total 657 ($15,305,654), have been approved, 459 ($11,982,700) have been declined or found ineligible, 142 ($5,936,599) have been withdrawn by applicants before being processed, and 20 ($320,870) are pending. Of the applications approved, 263 ($1,641,317) were approved for amounts less than applied for.

The following loans were approved from January 1, 1963, through March 31, 1963:

New England Area: Boat Pelican, Inc., New Bedford, Mass., $23,513;

South Atlantic and Gulf Area: Pete Smirch, Freeport, Texas, $19,647;

California: Glenn A. McCune, Crescent City, $20,000; Douglas N. Fearon, Cupertino, $20,000; Leo Leroux, San Pedro, $9,030; Donald R. Pache, Smith River, $3,000;

Pacific Northwest Area: Ben F. Jones, Newport, Oregon, $8,200; Ole I. Olson, Seattle, Wash., $7,000;

Alaska: Thomas W. Maloney, Auke Bay, $6,600; Erling O. Broderson, Homer, $40,000; Philip C. Lesher, $22,000; Donald A. Davis, Ketchikan, $4,015.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the first quarter of 1963, 9 applications to insure mortgages for $305,015 were received and commitments to insure mortgages in the amount of $140,865 on 3 fishing vessels were approved. Since the start of this program (June 5, 1960), 23 applications were received for $1,853,611. Of the total, 15 applications have been approved for $1,798,096. Approval of 8 applications for $55,515 is pending. Since the Mortgage Insurance Program began, applications received and approved by area were:

New England Area: Received 9 (762,490), approved 7 ($622,490);

California: Received and approved 1 ($557,000);

South Altantic and Gulf Area: Received 9 ($326,575), approved 3 ($111,060);

Pacific Northwest Area: Received and approved 4 ($507,546).

In the Construction Differential Subsidy Program, no applications were received during the first quarter of 1963. One pending differential subsidy payment to Stagan Corporation for about $51,700 was approved during the quarter. The first approval in this program was made in March 1961. The amount approved for subsidy represents about one-third the cost of a new vessel. Since the beginning of the program on June 12, 1960, 9 applications (excludes several ineligible applications) were received for $698,325, of which 6 applications were approved for $547,658. Approval of 3 applications for about $150,667 under this program is pending.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JANUARY 1963:

Imports of fresh, frozen, and processed edible fish and shellfish into the United States in January 1963 were up 0.1 percent in quantity, but down 10.9 percent in value from those in the previous month. Imports were up in January for fish blocks and slabs, groundfish fillets, frozen tuna other than albacore (increase mostly from Peru and British West Africa), swordfish fillets, yellow pike fillets, frozen salmon, canned crab meat, and sea scallops. But there was a decline in imports of most other fishery products. Imports of frozen albacore tuna dropped to a very low level in January and imports were also down substantially for canned tuna in brine, canned sardines in oil and not in oil, lobsters from Canada, and frozen shrimp (decline mostly from Mexico).

Compared with the same month in 1962, the imports in January 1963 were down 2.7 percent in quantity and 13.4 percent in value. There was a sizable decline this January in imports of canned salmon, frozen albacore tuna, canned tuna in brine, canned sardines in oil, canned oysters, and frozen spiny lobster tails (decline mostly from South Africa). The decline was offset partly by a large increase in imports of frozen tuna other than albacore, and fish blocks and slabs.

U. S. Imports and Exports of Edible Fishery Products, January 1963 with Comparisons

Item	Quantity			Value		
	Jan.		Year	Jan.		Year
	1963	1962	1962	1963	1962	1962
	(Millions of Lbs.)			(Million of $)		
Imports:						
Fish & Shellfish:						
Fresh, froz. & processed 1/	86.6	89.0	1,169.7	27.9	32.2	397.4
Exports:						
Fish & Shellfish:						
Processed only 1/ (excluding fresh & frozen)	3.7	3.5	35.6	1.6	1.4	16.0

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

Exports of processed fish and shellfish from the United States in January 1963 were down 22.9 percent in quantity and 23.8 percent in value from those in the previous month. There was a sharp drop in January in exports of canned sardines not in oil and exports were also down for canned shrimp and canned mackerel. The decline was offset partly by a modest increase in exports of canned salmon and canned squid.

Compared with the same month in 1962, the exports in January 1963 were up 5.7 percent in quantity and 14.3 percent in value. There was a big increase in exports of canned salmon this January, but there was a substantial decline in exports of canned mackerel.

* * * * *

IMPORTS OF TUNA CANNED IN BRINE UNDER QUOTA PROVISO FOR 1963:

The quantity of tuna canned in brine which may be imported into the United States during calendar year 1963 at the 12½ percent rate of duty is limited to 63,130,642 pounds (or about 3,006,221 standard cases of 48 7-oz. cans). This is 6.9 percent more than the 59,059,014 pounds (about 2,812,000 standard cases) in 1962, 10.5 percent more than the 57,114,714 pounds in 1961, 18.1 percent more than the 53,448,330 pounds in 1960, 20.5 percent more than the 52,372,574 pounds in 1959, 41.2 percent more than the 44,693,874-pound quota for 1958, and 38.9 percent more than the 45,460,000-pound quota for 1957. Any imports in excess of the 1963 quota will be dutiable at 25 percent ad valorem.

Any tuna classifiable under the Tariff Act of 1930, as amended, paragraph 718(b)--fish, prepared or preserved in any manner, when packed in airtight containers. . .(except fish packed in oil or in oil and other substances;. . .)--which is entered, or withdrawn, for consumption is included.

A proclamation (No. 3128), issued by the President on March 16, 1956, gave effect to an exchange of notes with the Government of Iceland to withdraw tuna canned in brine from the 1943 trade agreement and invoked the right to increase the duty reserved by the United States in negotiations with Japan and other countries under the General Agreement on Tariffs and Trade. The quota is based on 20 percent of the previous year's United States pack of canned tuna.

The 1963 tariff-rate quota was published in the April 17, 1963, Federal Register by the

Bureau of Customs of the U. S. Department of the Treasury.

Note: Pounds converted to cases at 21 pounds equal 1 standard case of 48 7-oz. cans.

* * * * *

IMPORTS AND EXPORTS OF FISHERY PRODUCTS, 1962:

In 1962, about 47 percent of the United States supply of fishery products was obtained from foreign countries, according to preliminary data. Imports were at record levels for such products as groundfish fillets and blocks, shrimp, sea scallops, spiny lobsters, frozen tuna, tuna loins, canned oysters, and fish meal.

Table 1 - U. S. Imports of Selected Fishery Products, 1961 and 1962

Commodity	1962	1961	Percentage Change from 1961 to 1962	
			Increase	Decrease
	(1,000 Lbs.)			
Groundfish and ocean perch:				
Fillets	77,907	76,490	2	-
Blocks and slabs	143,539	118,609	21	-
Total	221,446	195,099	14	-
Fillets, other than groundfish:				
Flounder	18,442	18,420	-	-
Fresh-water fish	10,672	9,840	8	-
Other	21,450	27,974	-	23
Swordfish, incl. steaks & chunks	19,644	19,033	3	-
Tuna, fresh or frozen:				
Albacore	83,940	71,945	17	-
Other than albacore	188,525	125,182	51	-
Total	272,465	197,127	38	-
Tuna loins and discs	10,522	8,348	26	-
Tuna, canned in brine:				
Albacore	27,836	29,116	-	4
Other than albacore	28,526	29,116	-	2
Total	56,362	58,232	-	3
Tuna, canned in oil	358	431	-	17
Bonito and yellowtail, canned	6,128	6,853	-	11
Crabmeat, canned	3,506	4,237	-	17
Lobster, fresh or frozen:				
Northern	22,102	21,299	4	-
Spiny	35,948	32,610	10	-
Lobster and spiny lobster, canned	3,309	2,828	17	-
Oysters and oyster juice, mostly canned	7,828	7,701	2	-
Salmon:				
Fresh or frozen	9,735	12,309	-	21
Canned	6,844	7,167	-	5
Sardines:				
Canned in oil	32,613	27,877	17	-
Canned not in oil	17,317	14,611	19	-
Sea scallops, fresh or frozen	11,564	8,652	34	-
Frog legs, fresh or frozen	2,598	2,089	24	-
Shrimp, mostly frozen, some canned and dried	141,384	126,268	12	-
	(Tons)			
Fish Meal	252,307	217,845	16	-
Fish Solubles	6,308	6,739	-	6

During 1962, United States exports of fishery products showed some recovery from the low levels of 1961.

Table 2 - U. S. Exports of Selected Fishery Products, 1961 and 1962

Commodity	1962	1961	Percentage Change from 1961 to 1962	
			Increase	Decrease
	(1,000 Lbs.)			
Misc. fish, mostly fresh-water, fresh or frozen	13,957	3,608	287	-
Oysters, shucked	411	579	-	29
Salmon:				
Fresh or frozen	1,507	1,094	38	-
Canned	8,978	7,186	25	-
Mackerel, canned	4,271	3,908	9	-
Misc., canned fish, mostly Calif. anchovies	531	454	17	-
Sardines:				
Canned not in oil	7,188	7,475	-	4
Canned in oil	578	185	212	-
Shrimp 1/:				
Fresh or frozen	3,457	4,771	-	28
Canned	2,212	2,503	-	12
Squid, canned	7,785	3,432	127	-
Whale and sperm oil	2,697	1,208	123	-
Fish oils	123,050	122,486	1	-

1/Does not include re-exports of Mexican shrimp.

Note: See Commercial Fisheries Review, May 1962 p. 35.

Vessel Equipment

FIRM TO BUILD AND SELL CONTROLLABLE PITCH PROPELLER:

A corporation with research and development offices in Wilmington, Mass., has obtained an exclusive license to build and sell a controllable pitch marine propeller which was designed by a marine products firm in Warren, R.I. In a statement announcing the license on February 19, 1963, an official of the corporation said his company was interested in new applications of the propeller for hydrofoils and other high-speed craft, as well as large ocean-going vessels, research vessels, fishing vessels, and tugboats.

The controllable pitch propeller, which is one of a few that are designed and built in the United States, has been used at sea in various vessels for more than two years. It was installed on the Gosnold, an oceanographic ship of the Woods Hole Oceanographic Institution, and the Narragansett, the first United States automated stern trawler.

Virginia

ELECTRONIC COMPUTER SPEEDS RESEARCH AT MARINE LABORATORY:

The purchase of a transistorized analog computer for use in marine research projects was announced by the Virginia Institute of Marine Science on April 5, 1963. The Director of the Institute said, "Although this is a relatively small model, compared to computers used by large industries and Federal agencies, it represents a step forward in providing better up-to-date tools for marine research. Such devices can hasten considerably the development of various research projects."

The computer has been put to work on plankton studies sponsored by the Office of Naval Research. Its application is to stimulate behavior of natural plankton systems through the use of mathematical models. In this manner, it will be possible to formulate and test theories of the basic productivity of plankton.

The scientist in charge of plankton research pointed out that the computer can also be used in other research projects at the Institute, including studies of water mass movements, waves, beach erosion, and population dynamics of selected marine organisms. It can be applied whenever a scientist can formulate a mathematical model of his research problem which employs differential equations.

Washington

VESSEL REDUCTION IN PUGET SOUND SALMON FISHERY RECOMMENDED:

Serious misuse of two of Washington State's more important resources--salmon and manpower--has turned the once-dynamic Pudget Sound salmon fishery into an industry with continuing conservation and grave economic problems. Despite some salmon runs of near-record size, the inland sea's commercial fisherman is going broke. His net income, according to a recent University of Washington study, averages considerably less than $2,000 a year and in many instances, such as in purse-seine fishing, it is impossible for him to earn even one-half of the average income received by all Washington State residents. In addition, an increased fishing effort on the Pudget Sound salmon runs has presented serious conservation problems. More and more fishermen, using more efficient gear and fishing over an expanded area are threatening to deplete the fish stocks entirely.

In April, 1962, the University of Washington's Fisheries Research Institute was asked by the State Legislative Interim Fisheries Committee to find out not only why incomes were depressed, but to make recommendations to correct both the economic and conservation problems. In an unusual interdisciplinary study, Dr. Gerald J. Paulik and Dr. Donald E. Bevan of the Research Institute joined with Dr. James Crutchfield of economics and Prof. Robert L. Fletcher of law, to provide a biostatistical, economic, and legal analysis of the Puget Sound salmon industry. Dr. William F. Royce of the Fisheries Research Institute was in charge of the project.

Among their findings, the University study group concluded that the biggest problem in the fishery was overdevelopment and recommended that the present fleet be cut by one-third. Basing their recommendation upon statistical studies, the researchers pointed out that in 1945, slightly more than 1,500 units of fishing gear were employed to harvest 52 million pounds of salmon. In 1961, nearly three times that amount of gear was used to harvest only 30 million pounds of salmon. "Over the past 15 years we have been using more and more fishing effort to catch fewer and fewer fish," said Dr. Crutchfield. "By any standard--physical or economic--this is inefficient."

To achieve the fleet reduction, the University study group recommended that the number of commercial fishing licenses presently issued be frozen to enable the weeding out of licenses for vessels which have not fished for salmon within the past few years. Then, the researchers continued, license fees should be raised to levels bearing a more realistic relationship to the value of the fishing privilege conferred. The University study also recommended that the license revenues be used in a revolving fund to permit the State to buy out some of the fishermen (at the fisherman's option) and take their gear out of service. Those recommendations and others proposed by the Research Institute are now being studied by the Legislative Committee as well as representatives of the fishing industry. It is expected that legislation will be drafted and submitted to the State Legislature before the end of this session.

"The general reaction to the study has been favorable," said Dr. Royce, project coordinator. "Of course people in each group have some reservations until they see how it will affect their particular interests. No one questions the need for a fleet reduction. It is a question now of who will be cut." Dr. Crutchfield commented further: "The basic issue is not how, but who shall harvest the fishery. No one has any responsibility for, or ability to, reduce and as long as anyone is free to enter the fishery whenever he wants, there is no reason for any one unit to reduce. The situation, therefore, is not self-corrective. Under any method of calculation we are wasting from $1 to $4 million a year by having too many men and ships tied up."

Puget Sound fishermen, using purse seine, gill net and reef net gear, harvest primarily the sockeye and pink salmon runs from the outer San Juan Straits, through the Pudget Sound waters, to the Fraser River in British Columbia. These runs are under the regulation of the International Pacific Salmon Commission which provides for equal catches by Canadian and United States fisheries. In previous years, in order to preserve the fish stock, the Commission adopted regulations limiting the size of fishing vessels, prohibiting the use of certain gear and either closing or greatly reducing fishing in major areas.

Conservation has been achieved by gross reductions in fleet efficiency, which is hardly the most economical

way of running a business as Dr. Crutchfield pointed out in his economic analysis. "Conservation is more than fish biology," he said. "It also involves people--those who catch the fish and those who eat them. Regulations which have the effect of reducing economic efficiency are wasteful. No business would think of operating in this manner."

The question now before members of the Legislative Committee is whether or not the fleet reduction would work, and if it did, would it be legal? Using factors determined from recent fishing data collected by the Washington State Department of Fisheries, Drs. Paulik and Bevan translated approximately 1,000 mathematical equations into instructions to simulate salmon runs, fishing activity and the catch under various conditions on the University's IBM 709 computer. From these studies, the researchers concluded that even with a one-third reduction in the fishing fleet, the fishery would still harvest even large salmon runs without approaching the exploitation limits of the present gear. Even with a 50 percent fleet cut, all but the very large and unexpected salmon runs could be harvested.

Dr. Crutchfield conservatively estimated that a one-third reduction in gear would save from $700,000 to more than $2.5 million depending upon the size of the run and the ability of the fleet to harvest it. A 50-percent cut, he added, would yield savings from $1 to $4 million. In addition, the fleet reductions would (1) increase individual unit efficiency, (2) enable the Commission to relax some of the restrictions on gear efficiency, (3) minimize the risk of loss from breakdown, (4) improve the quality of the end product by spreading out deliveries to packers over a 4- or 5-day week and (5) extend the fishing week to 4 or 5 days which would improve the management problem.

The scientist explained that at the present time the Commission relies upon the fishermen for information as to size of runs, timing, etc. Under present regulations it is difficult to know what is occurring in the Pudget Sound waters during the closed period. "Even in one day of fishing, the present fleet is capable of catching dangerously large proportions of the given number of salmon. The longer the fishing week, the greater the range and accuracy of information reaching the Commission and the more accurate its regulatory techniques can be made."

Will a legislative provision restricting the number of commercial fishermen in a major portion of the State's salmon fishery be constitutionally valid? In the opinion of Professor Fletcher, who conducted the legal studies for the University survey, the answer is "yes" He said "In the early history of the United States Supreme Court, such a scheme perhaps would have been held unconstitutional as some sort of unwarranted deprivation of property or liberty, or possibly as some sort of discriminatory denial of equal opportunity to pursue gainful employment. In modern times, however, the Supreme Court is most tolerant of legislative judgements of economic matters."

Any kind of legislation will stand the tests of constitutionality, he said, if it has these minimum requirements: (1) a rational determination that some benefit to the general welfare of the people will be served by the legislation; (2) it is founded upon some basis of fact; and (3) it includes a rational choice of means to accomplish the objective.

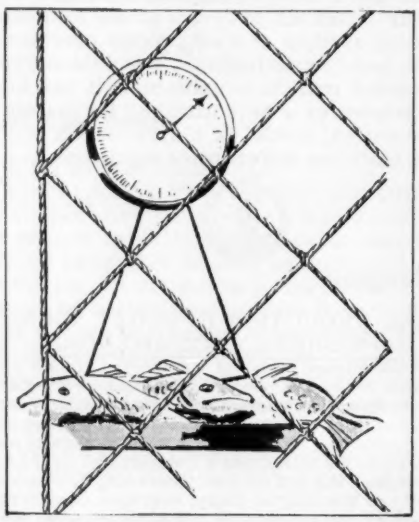
"No one would quarrel with the proposition that the wise use of a natural resource is a matter of utmost concern to the legislature and the people," said Dr. Fletcher. "So far we have not attributed to the fishing grounds the same incidents of area control that we do in the case of ordinary land ownership."

One of the important principles behind the University's Puget Sound Salmon Survey is the introduction of an entirely new concept in the fisheries industry--that economic efficiency is an important criteria for regulatory policies.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, MARCH 1963:

Wholesale prices for edible fish and shellfish (fresh, frozen, and canned) in March this year dropped slightly (0.9 percent) from February 1963 due primarily to lower ex-vessel prices for fresh drawn haddock and lower wholesale prices for fresh haddock fillets, frozen dressed halibut and salmon, fresh



shrimp, and canned Maine sardines. Compared with the same month a year ago, wholesale prices for fishery products this March were lower by 2.5 percent due mainly to lower prices for fresh dressed and filleted haddock, a smaller drop in prices for frozen flounder and ocean perch fillets, and generally lower prices for canned fish products.

The drawn, dressed, and whole finfish subgroup index in March 1963 was down 1.2 per-

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1963 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Mar. 1963	Feb. 1963	Mar. 1963	Feb. 1963	Jan. 1963	Mar. 1962
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					117.3	118.4	121.9	120.3
Fresh & Frozen Fishery Products:					123.0	124.4	130.0	119.4
Drawn, Dressed, or Whole Finfish:					121.2	122.7	137.2	121.8
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.12	91.9	94.6	162.9	124.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.41	.43	122.2	125.6	128.1	116.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.95	.96	132.7	133.8	134.5	120.5
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.68	.68	100.7	100.7	106.0	111.9
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.69	.69	113.0	113.0	88.5	120.4
Processed, Fresh (Fish & Shellfish):					125.5	128.5	130.4	123.2
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.39	.41	94.7	98.3	137.2	121.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.07	1.12	125.4	130.7	127.2	117.2
Oysters, shucked, standards	Norfolk	gal.	7.75	7.75	130.7	130.7	132.8	130.7
Processed, Frozen (Fish & Shellfish):					117.3	117.3	117.5	109.0
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	97.6	98.9	100.1	100.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.37	.37	108.5	108.5	107.0	101.1
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.34	.33	117.5	115.7	117.5	119.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.04	1.04	123.4	123.4	123.9	112.1
Canned Fishery Products:					107.7	108.0	108.0	122.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.75	24.75	107.9	107.9	107.9	124.2
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.75	11.75	104.4	104.4	104.4	107.9
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	5.90	5.90	2/ 100.0	2/ 100.0	2/ 100.0	3/ 118.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	9.06	9.31	116.2	119.4	119.4	164.3

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

2/ One commodity has been dropped in the fishery products index as of December 1962--"Sardines, Calif., tom. pack, No. 1 oval (15-oz.), 24 cans/cs."--and replaced in the fishery products index by--"Mackerel, jack, Calif., No. 1 tall (15-oz.), 48 cans/cs." Under revised procedures by the Bureau of Labor Statistics all new products enter wholesale price indexes at 100.

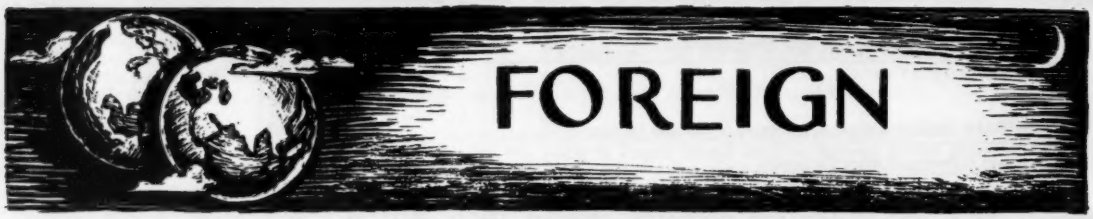
3/ Based on Calif. sardines and not directly comparable with new subgroup item (jack mackerel) for January-March 1963.

cent from a month earlier, and dropped about 0.5 percent from March a year ago. Lower ex-vessel prices at Boston for fresh drawn haddock (down 2.9 percent), plus further declines in wholesale prices for frozen dressed halibut and salmon were responsible for the decrease from February to March this year. From March a year ago to March this year, a decrease of 25.9 percent in the drawn fresh haddock price and lower prices for the freshwater varieties were just about cancelled out by higher prices for frozen salmon and halibut.

The fresh processed fish and shellfish subgroup index this March decreased 2.3 percent from a month earlier but was up 1.9 percent from March 1962. From February to March this year, prices were lower for fresh haddock fillets at Boston (down 3.7 percent) and fresh shrimp at New York City (down 4.1 percent). The fresh shucked oyster price was unchanged from February to March 1963 and remained at the same level as March a year ago. As compared with March 1962, fresh haddock fillets this March were down 22.0 percent, but fresh shrimp prices were higher by 7.0 percent.

The March 1963 processed frozen fish and shellfish subgroup price index was unchanged from the preceding month but was up 7.6 percent from the same month of 1962. From mid-February to mid-March this year, prices for frozen flounder fillets dropped 1.3 percent but frozen ocean perch fillets were higher by 1.6 percent. Compared with the same month a year ago, the March 1963 subgroup index was up because of higher frozen shrimp prices at Chicago (up 10.1 percent) and an increase of 7.3 percent in the frozen haddock fillet price. As compared with March last year, prices for frozen flounder and ocean perch fillets were slightly lower.

The canned fishery products subgroup index from February to March 1963 dropped slightly (0.3 percent) due to lower prices for canned Maine sardines. From March a year ago to this March, the subgroup index dropped 11.8 percent because of a sharply lower canned Maine sardine price (down 29.3 percent), a lower canned pink salmon price (down 13.1 percent), and a 3.2 percent drop in the canned tuna price.



International

EUROPEAN FREE TRADE ASSOCIATION

DENMARK AND NORWAY CONFER ON TARIFF REDUCTION:

Bilateral talks between Denmark and Norway were held in Oslo, Norway, during the latter part of March 1963, to discuss proposals to accelerate the reduction of internal tariffs between the seven member countries of the European Free Trade Association (EFTA). Norway is interested in concessions on fish and fish products, and Denmark is concerned about tariffs on its agricultural products. Final discussions between the two countries were to be held at the Nordic Foreign Ministers Meeting in Oslo, April 26, prior to the EFTA Council Meeting in May 1963.

The Norwegian Commerce Minister observed that when EFTA was established in 1959, Norway felt there was a reasonable balance between the interests of the Member countries. A 10-year program was then adopted for liquidation of internal tariffs on industrial goods. Current proposals to remove those tariffs by 1966, he maintained, were chiefly in the interest of the most advanced industrial EFTA nations. Norway and Denmark, which are not particularly interested in accelerating the tariff reductions, would naturally demand concessions in other fields in order to maintain the original balance of interests, he declared. (News of Norway, April 4, 1963.)

FISH MEAL

FISH MEAL PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-DECEMBER 1962:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

In 1962, Peru accounted for 74.9 percent of total fish meal exports by FEO countries, followed by South Africa with 13.5 percent, Iceland with 5.0 percent, Norway with 4.3 percent, and Angola with 2.3 percent. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, March 6, 1963.)

Production and Exports of Fish Meal by Member Countries of the Fish Meal Exporters' Organization, Jan.-Dec. 1962

Country	1962			
	December		Jan.-Dec.	
	Production	Exports	Production	Exports
	(Metric Tons)			
Angola	3,717	3,895	32,758	32,558
Iceland	2,167	7,498	96,147	70,931
Norway	4,557	10,387	120,927	61,690
Peru	155,915	107,621	1,120,796	1,065,952
South Africa (incl. S. W. Africa)	-	11,290	201,219	192,931
Total	166,356	140,691	1,571,847	1,424,062

* * * * *

WORLD PRODUCTION, JANUARY 1963:

World production of fish meal in January 1963 was 48.2 percent greater than in the same month of 1962, according to preliminary data from the International Association of Fish Meal Manufacturers. World production during the year 1962 was reported as 2,199,465 metric tons.

Most of the principal countries producing fish meal submit data to the Association monthly (table).

World Fish Meal Production by Countries, January 1963

Country	January		Jan.-Dec.
	1963	1962	1962
	(Metric Tons)		
Canada	7,516	14,442	79,371
Denmark	6,118	3,225	91,110
France	1,100	1,100	13,200
German Federal Republic	5,975	5,611	72,442
Netherlands	1/	1/	2/ 4,600
Spain	2,085	1,914	25,499
Sweden	444	698	5,000
United Kingdom	6,443	5,751	74,184
United States	2,072	2,478	3/261,521
Angola	2,956	3,278	32,767
Iceland	9,476	1,421	96,147
Norway	3,659	4,081	120,924
Peru	145,659	78,979	1,121,096
South Africa (including South-West Africa)	10,522	14,700	3/201,604
Total	204,025	137,678	2,199,465

1/Data not available.
2/Data available only for January-November 1962.
3/Revised.
Note: Belgium, Chile, Japan, and Morocco do not report their fish meal production to the International Association of Fish Meal Manufacturers at present.

International (Contd.):

The increase in world fish meal production in January 1963 was due mainly to greater output in Peru, which accounted for 71.4 percent of the total production during the month.

World fish meal production during 1962 was increased by heavier landings of anchoveta in Peru, record landings of pilchards in South Africa, record landings of summer herring in Norway and Iceland, and increased landings of industrial fish in Denmark.

In 1962, Peru accounted for 51.0 percent of total fish meal production, followed by the United States with 11.9 percent and South Africa with 9.2 percent.

GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN

HOLDS SEVENTH SESSION IN MADRID:

The General Fisheries Council for the Mediterranean was scheduled to hold its 7th session in Madrid, March 12-18, 1963. About 70 participants from the Council's 13 member nations were due to attend the meeting which was sponsored by the Food and Agriculture Organization (FAO).

Among other topics to be discussed at the meeting were the marine resources of the Mediterranean, present trawling grounds, Mediterranean fishing boats, gear and methods, light fishing, echo sounders, preservation of fishery products, water pollution, and fishing and fish culture in inland waters.

The Council meeting was to be followed by a visit to the fishing harbor of Vigo in northwest Spain.

NORTHWEST PACIFIC FISHERIES COMMISSION

SOVIET-JAPANESE FISHERY MEETING IN TOKYO:

The Seventh Annual Meeting of the International Northwest Pacific Fisheries Commission (Japan and Russia) opened March 4, 1963, at Tokyo. The outgoing Soviet Chairman, in calling the Conference to order, stated he was confident the meeting would reach a satisfactory conclusion. The Japanese Minister of Agriculture and Forestry, in a welcoming address remarked that the Government of Japan has endeavored through conservation measures to maintain the productivity of the fisheries resource for the fishing industry. He hoped that the Conference, basing its findings on scientific data, would reach an amicable decision on the conservation of the resources and not drag on too long.

The agenda contained 22 items, the most important of which were: (1) condition of the salmon and salmon-trout resources in the Convention area; (2) discussion of the total annual catch of salmon and salmon-trout and necessary measures to restrict fishing operations; (3) condition of the crab resources and necessary measures for restricting operations; and (4) procedures for controlling fishing operations in the Convention area.

Under agenda item (4), it was rumored the Soviets proposed sending their patrol vessels to enforce fisheries regulations of the Commission in Area B, which is south of 45° N. latitude. Such a move will be resisted strongly by the Japanese since they consider that area part of the Convention waters. But having permitted the boarding of Soviet inspectors on Japanese patrol vessels in the area during the 1962 season, the Japanese may find it hard to block this proposal.

The Japanese Fishery Agency believed the length of the conference would depend on (1) Soviet determination to enforce fisheries regulations in Area B, and (2) Soviet resistance to Japanese demands for a 10-percent increase in the salmon catch quota for the mothership fishing area (Area A). The salmon catch quota for that area in 1962 was 55,000 metric tons. At the 1962 conference it was reported that the Japanese Minister of Agriculture and Forestry, and Soviet Minister of Fisheries, verbally agreed that the salmon catch quota in Area A for the 1963 season would be increased 10 percent. However, in a press interview, one of the Soviet Commissioners commented that the question of this 10-percent increase should be settled only after full discussions by the Scientific and Technological Subcommittee. As for the Japanese catch quota in Area B (60,000 tons in 1962), it was agreed in writing last year that the 1962 quota would be increased 10 percent in 1963.

The two controversial issues appeared to be the 1963 quota in Area A and the Soviet enforcement of the regulations in Area B. Another rumor indicated that if negotiations became deadlocked, a settlement on a political basis would be worked out by the Japanese and Russian Ministers.

On the third day of the conference as many as 13 agenda topics were considered and finished and a recommendation to the respective Governments was raised so that in 1963 viola-

International (Contd.):

tion of rules and agreements by fishing vessels should be eliminated. Violations by Japanese vessels were much more numerous than Soviet vessels in 1962.

Discussions at the Science Subcommittee began on March 7 with the evaluation of pink salmon resources. On March 8, an exchange of reports on the total catch of salmon by each nation was made. The Soviet catch of salmon in 1962 was 60,560 metric tons (quota 70,000 tons) and the 1961 catch was 79,738 metric tons. The Japanese catch of salmon was about 114,000 metric tons in 1962 (quota 115,000 metric tons) and for 1961 the actual catch was 154,000 metric tons. Agreement on the appraisal of pink salmon resources was finally reached on March 11 with the conclusion that the resources of this species have generally declined and that the run in 1963 would be lower than an average cycle-year level. Evaluation of chum salmon resources was then handled on March 11 and finished on the next day. On March 13, discussion of the condition of red salmon resources was started. (United States Embassy, Tokyo, March 8, 1963 and Japanese Newspapers, March 14, 1963.)

ORGANIZATION FOR
ECONOMIC COOPERATION AND DEVELOPMENT

FISHERIES COMMITTEE MEETING HELD:

The Fisheries Committee of the Organization for Economic Cooperation and Development (OECD) met in Paris, France, February 25-26, 1963, to consider a study of subsidies and technical operational activities which involve sanitary regulations for canned fish and quality standards for frozen fish. The detailed 1964 operational program was also discussed. The United States representative was A. W. Anderson, Regional Fisheries Attache for Europe.

SCIENTIFIC CONSULTANTS DRAFT
PROGRAM FOR STUDIES ON SEA POLLUTION

A small group of scientists in a preparatory meeting called by the Committee for Scientific Research of the Organization for Economic Cooperation and Development (formerly Organization for European Economic Development) met in Paris on March 5-6, 1963, to discuss problems of sea pollution. At the meeting the scientists drafted a program of research for approval when the Committee meets again on June 12-14, 1963. The United States was represented at the meeting by scientists from the U. S. Bureau of Commercial Fisheries and the University of Washington, Seattle, Wash.

The experts reported to the Committee as follows:

The rapidly increasing discharge of polluting substances into the sea has created economic and health problems of the first magnitude for all advanced nations. Cooperative research in this field can be valuable in two ways: (1) by providing a feasible approach to problems truly international in character, such as oil pollution of the high seas; (2) by facilitating individual action in areas of common interest, such as the standardization of bioassay techniques.

A working group recommended by the scientists, if established by the Committee, should be able to achieve much toward increasing knowledge about vital sea pollution problems. If the recommendations of the scientists are adopted by the Committee for Scientific Research, further developments may require the commitments of funds, facilities, and personnel from the United States scientific effort. Returns in the form of cooperative research should be more than commensurate with such commitment.

The following draft recommendations and program of research were to be presented to the Committee for approval at its meeting on June 12-14.

(1) That the Scientific Research Committee proceed to the creation of a cooperative research group whose terms of reference would be to promote studies and research relating to pollution of the sea.

(2) That the delegates of this group be chosen among specialized marine scientists in the various branches of oceanography.

(3) That the group refrain from:

(a) making any proposals of texts containing regulations, agreements or conventions concerning problems of pollution of the sea;

(b) advancing wishes or recommendations to other international bodies on subjects outside scientific research;

International (Contd.):

(c) advancing wishes, recommendations or criticisms concerning any country, member or non-member of OECD on any act of pollution of the sea.

The draft program of research outlined by the scientists states that the principal objective of the program is to promote international cooperation in research on economically feasible means of reducing the effects of pollution in the sea. This aim could be achieved by the following actions:

(1) Collect documentation on the problems of sea pollution in the fields of study and regions chosen by the group.

(2) Report on research being done on sea water pollution or in any other field which could contribute to the solution of pollution problems.

(3) (a) Evaluate and assess methods of measuring the concentration of polluting substances in the sea;

(b) compare sampling and analysis methods;

(c) attempt to standardize these methods.

(4) Gather information on the origin and amounts of pollutants entering the sea, and their subsequent dispersal:

(a) study pollution of coastal waters;

(b) study of pollution of the high seas, including pollution at great depths.

(5) Promote research on physical and chemical interplay and interaction between sea water and pollutants (self-purifying effect of sea water against microbiological pollution, chemical reaction between industrial (effluents) pollutants and sea water).

6. Promote studies--theoretical and instrumental--concerning the effects of water movements of all types on the distribution and dispersion of pollutants.

7. Promote studies on the pollution of sediments on the bed of the sea along the coast or beneath the high seas.

8. Standardize biological determinations of pollutants at all levels of the food chain from phytoplankton to marketable sea foods, including but not limited to: (a) uptake of materials, (b) tolerance levels, and (c) transport of deleterious materials within the food chain.

9. Promote and carry out studies on pollution effects on communities of living organisms in the sea. These studies would seek to discover the effects of pollutants on single species, but also possible secondary effects occurring because of the interdependence of populations composing the biological community. They would further encompass investigations of changes in the physical environment as related to their effects on the nature of the biological community. (United States Embassy, Paris, March 12, 1963.)

UNESCO INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

FISHERIES COMMITTEE MEETING HELD:

The Biological Committee of the Intergovernmental Oceanographic Commission (IOC) met in Cochin, India, February 24-26, 1963, and in New Delhi, India, February 28-March 1, 1963, to coordinate plans and programs for technical studies of the biology of the Indian Ocean in connection with the International Indian Ocean Expedition. The United States representative was Irvin E. Wallen, Assistant Director for Oceanography, Museum of Natural History, Smithsonian Institution.

Note: See Commercial Fisheries Review, September 1962 p. 58.

Aden Protectorate

SPINY LOBSTER FISHING AND MARKETING AGREEMENT REACHED:

Six months of negotiations between a New York City firm and various agencies of the Eastern and Western Aden Protectorate's Governments and the Sultan of the Quai'ti State of the Eastern Aden Protectorate seem to have resulted in an agreement for catching and marketing spiny lobster or crayfish. It provides first for the creation of a "Mukalla Crayfish Association." (Mukalla is the largest city and principal fishing port of the Eastern Aden Protectorate, the capital of the Quai'ti State).

The Association will have a monopoly on the catching of spiny lobsters, and will organize, assist, and advise the fishermen. The fishermen, in turn, will sell all their catch to the Association, which will pay a premium

Aden Protectorate (Contd.):

price to be determined by the Association. A price has been agreed upon which is satisfactory to all concerned parties. The Association will deliver the frozen and deveined spiny lobsters to the New York firm who will have the exclusive distribution rights for the entire catch which they will then sell, probably almost entirely in the United States.

The Association is starting out without funds. To overcome this, the New York firm will advance or lend the Association the necessary money to begin operations, this money to be repaid from the final sale of the spiny lobsters, with 6 percent interest. In addition, after the firm will deduct its 10 percent commission from the sale price of the spiny lobsters, before the balance is credited to the Association, practically all the expenses of the operation will be deducted, including ocean freight from Aden to the port of destination, and the salary and expenses of the New York firm's advisor now in Mukalla. The New York firm has exclusive distribution rights for a term of five years. Initial shipments of about 10 tons were due to begin in April this year. (United States Consul, Aden, March 16, 1963.)

Note: See Commercial Fisheries Review, September 1962 p. 62.

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AVAILABILITY OF YELLOWFIN TUNA DEMONSTRATED BY EXPLORATORY FISHING:

The Aden Government, the Federation of South Arabia, the administration (British) of the Eastern and Western Aden Protectorates, and the various rulers of the Sheikhdoms bordering on the Gulf of Aden and the Indian Ocean, are very interested in developing the tuna fishing potentialities of the Gulf of Aden. At the present time the real potentialities of the area are not known, but surveys and tests are continuing. The Fisheries Department is utilizing all its resources in this direction. At least two United States companies have sent representatives to Aden to survey the feasibility of taking tuna in commercial quantities from the area; and it is hoped that the Indian Ocean surveys now in progress will shed more light on the potentialities of this area. An account of the exploratory fishing operations by the British Fisheries officer in Aden follows:

In July 1962, at about the midpoint of the Southwest Monsoon, the Federation of South Arabia Fisheries vessel, the 65-foot trawler, Gulf Explorer, under the direction of the Fisheries Officer, began trial operations with Japanese tuna long lines in an area within 26 miles of Aden, to determine the abundance of yellowfin tuna in the Gulf of Aden area. At first, long lines of 150 hooks each were used, and catches were fairly low or about 9-15 fish per set. In the fall, a Japanese tuna long-line expert was assigned by the Food and Agriculture Organization (FAO) to Aden and he began operating from the Federal Star, a slightly smaller Federal Fisheries vessel. The Japanese expert made his first trial runs off the small fishing port of Shuqra, about 75 miles east of Aden, using long lines of 150 hooks each. Over a six-week period catches averaged about 13.6 percent or about 20 fish per set. In December, well into the season of of the Northeast Monsoon, the Gulf Explorer, still using long lines of 150 hooks, began averaging a 40 to 50 percent catch rate. In January 1963, a 6-mile experimental long line of 250 hooks averaged a catch rate of 54 percent. At about this time, the Federal vessels were joined by the Genepesca VII of Livorno, Italy,

Fig. 1 - Genepesca VII, Italian fishing boat from Livorno.

Aden Protectorate (Contd.):

which had come out for survey purposes. Assisted by the FAO expert, the Genepesca VII made several trial sets using two-mile long lines of 220 hooks each. On the first three days of fishing the vessel caught fish at rates of 60, 63, and 73 percent.

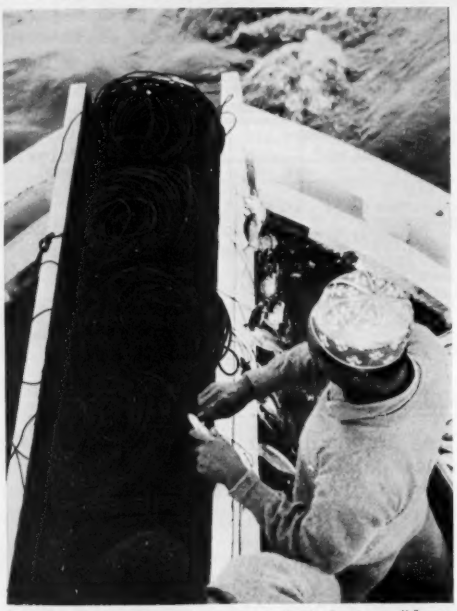

Fig. 2 - Lines prepared by crew are baited prior to "shooting," and are then placed on the "shooting table."

All three of the vessels fished between the depths of 50 and 65 fathoms. The depth of the thermocline was determined by a thermistor thermometer, developed by the Fisheries Laboratories, Lowestoft, England, a comparatively simple and inexpensive instrument. The area of greatest success was within a 25-mile radius of Aden itself. The yellowfin taken averaged from 22 to 37 pounds each, although there were exceptional catches of 60 and 157 pounds each. The most successful baits used in the order of their efficiency were: Indian mackerel, scad mackerel, and large sardines. Analysis of the yellowfin stomach contents showed mostly mantis shrimp and later on, during the Northeast Monsoon, swimming crabs. Shark, marlin, swordfish, and sailfish were taken on the same lines.

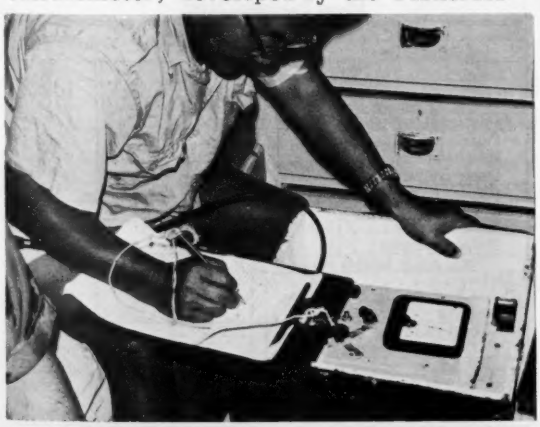

Fig. 3 - FAO Japanese tuna fishing expert taking readings from thermistor thermometer to establish thermocline.

Fig. 4 - Portion of a morning's catch of yellowfin tuna.

The Federal Fisheries Department in Aden, with the able assistance of the FAO's expert, has designed for the use of local fishing vessels a tuna long line carrying a large number of hooks on short branch lines to be used on one-day trips. The Fisheries Department is attempting by every means possible to assist local fishermen and perhaps develop eventually an indigenous fishing industry.

Aden Protectorate (Contd.):

From the data available, it appears that the prospects seem good for the taking of commercial quantities of yellowfin tuna from the Gulf of Aden. However, the data collected thus far is an inadequate basis for final conclusions. For the future, the Fisheries officer is putting into motion a long-term exploratory and survey program utilizing equipment and techniques developed during the initial trial period. (United States Consulate, Aden, March 23, 1963.)

Australia

IMPORTS AND EXPORTS OF MARINE PRODUCTS, FISCAL YEAR 1961/1962:

Imports: Australian imports of edible fishery products in fiscal year 1961/1962 (July 1961-June 1962) were down 12 percent in value from the previous year. From a volume standpoint, imports of canned fishery products showed a 20 percent decline, while imports of fresh and frozen fishery products dropped 7 percent.

Table 1 - Australian Imports of Edible Fishery Products Fiscal Year, 1961/1962

Commodity and Country of Origin	Quantity	Value	
	1,000 Lbs.	A£ 1,000	US$ 1,000
Fresh and Frozen Products:			
Finfish Products:			
South Africa	10,538.7	753.7	1,681.5
United Kingdom	6,623.3	900.0	2,007.9
New Zealand	4,330.4	470.6	1,049.9
Denmark	4,303.9	577.9	1,289.3
West Germany	2,179.3	194.8	434.6
Other countries	3,389.1	415.0	925.9
Total finfish products	31,364.7	3,312.0	7,389.1
Shrimp:			
India	457.8	114.5	255.4
China	211.0	65.2	145.5
Hong Kong	190.2	54.1	120.7
Other countries	53.5	15.6	34.8
Total shrimp	912.5	249.4	556.4
Total fresh and frozen fishery products	32,277.2	3,561.4	7,945.5
Canned Products:			
Salmon:			
Japan	8,652.6	2,013.1	4,491.2
Canada	526.3	141.1	314.8
Other countries	191.4	57.1	127.4
Total salmon	9,370.3	2,211.3	4,933.4
Sardines:			
Norway	1,735.4	334.8	746.9
Canada	1,403.9	179.3	400.0
United Kingdom	1,329.1	222.8	497.1
Other countries	991.0	147.4	328.8
Total sardines	5,459.4	884.3	1,972.8
Herring:			
United Kingdom	3,497.1	355.5	793.1
Other countries	998.0	116.7	260.4
Total herring	4,495.1	472.2	1,053.5
Tuna	708.8	95.6	213.3
Other canned fishery products	1,987.4	422.4	942.4
Total canned fishery products	22,021.0	4,085.8	9,115.4
Smoked or Dried Products:			
South Africa	6,389.2	486.3	1,084.9
United Kingdom	1,677.0	172.0	383.8
Other countries	293.1	59.4	132.5
Total smoked or dried fishery products	8,359.3	717.7	1,601.2
Other fishery products	2,546.4	170.9	381.3
Total imports of edible fishery products	65,203.9	8,535.8	19,043.4

(Table continued on next column.)

Table 2 - Australian Imports of Inedible Fishery Products, Fiscal Year 1961/1962

Commodity and Country of Origin	Quantity	Value	
		A£1,000	US$1,000
	(1,000 Pounds)		
Fish Meal:			
South Africa	4,466.6	99.2	221.3
Other countries	939.6	21.8	48.6
Total fish meal	5,406.2	121.0	269.9
Cultured Pearls:			
Japan	1/	179.4	400.2
Other countries	1/	9.1	20.3
Total cultured pearls		188.5	420.5
	(1,000 Gallons)		
Marine animal oils	727.0	333.0	742.9
Total value of inedible fishery imports		642.5	1,433.3

1/Not available.

Exports: The value of exports of edible fishery product in fiscal year 1961/1962 amounted to almost A£6.5 million as compared with A£4.4 million in the previous year, an increase of about 47 percent. Shipments of frozen spiny lobster tails accounted for almost 92 percent of the total value of

Table 3 - Australian Exports of Edible Fishery Products, Fiscal Year 1961/1962

Commodity and Country of Destination	Quantity	Value	
	1,000 Lbs.	A£ 1,000	US$ 1,000
Fresh and Frozen Products:			
Spiny Lobsters, whole:			
France	341.6	117.6	262.4
United States	89.0	30.7	68.5
Other countries	79.7	25.5	56.9
Total spiny lobsters, whole	510.3	173.8	387.8
Spiny Lobster Tails:			
United States	9,736.4	5,955.6	13,287.0
Other countries	111.4	66.0	147.2
Total spiny lobster tails	9,847.8	6,021.6	13,434.2
Shrimp	120.8	39.9	89.0
Other fresh and frozen fishery products	1,444.9	197.4	440.4
Total fresh and frozen fishery products	11,923.8	6,432.7	14,351.4
Canned fishery products	321.1	57.4	128.0
Other fishery products	201.3	3.8	8.5
Total exports of edible fishery products	12,446.2	6,493.9	14,487.9

Australia (Contd.):

Table 4 - Australian Exports of Inedible Fishery Products, Fiscal Year 1961/1962

Commodity and Country of Destination	Quantity	Value	
		A£1,000	US$1,000
	(1,000 Gallons)		
Whale Oil:			
West Germany	922.2	295.0	658.1
United Kingdom	700.3	284.3	634.3
Other countries	277.6	91.7	204.6
Total whale oil	1,900.1	671.0	1,497.0
Other marine animal oils	9.8	48.7	108.6
	(1,000 Pounds)		
Whale meat, meal, and solubles	1,693.0	62.5	139.4
Fish meal	3.1	1/	1/
Mother of Pearl Shells:			
West Germany	716.7	192.5	429.5
United States	628.1	105.4	235.1
Other countries	665.9	87.0	194.1
Total mother of pearl shells	2,010.7	384.9	858.7
Other shells	649.5	57.0	127.2
Cultured pearls	2/	52.9	118.0
Natural pearls	2/	27.4	61.1
Total value of inedible fishery exports		1,304.4	2,910.0

1/Less than A£500.
2/Not available.

edible exports in 1961/1962. (Fisheries Newsletter, December 1962; Fish Trades Review, December 1962.)

Note: US$2.231 equals Australian £1.00.

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LANDINGS OF FISH AND SHELLFISH, 1960/61 AND 1961/62:

Landings of finfish in Australia during the fiscal year ending June 30, 1962, amounted to 78.7 million pounds, an increase of about 11 percent over the preceding fiscal year and close to the record landings of 79.5 million pounds landed in the fiscal year 1947/48. Six varieties (may include more than one species) made up close to 66 percent of Australia's total finfish landings in 1961/62.

Table 1 - Australian Landings of Principal Species, 1960/61 and 1961/62

Item	1961/62	1960/61	Percent Increase in 1961/62
	(1,000 Lbs.)		
Mullet	13,241	11,357	16.6
Australian salmon	11,534	6,630	73.9
Tuna	10,614	9,764	8.7
Shark	8,691	7,635	13.8
Barracouta	6,810	5,982	13.8
Flathead	6,458	5,141	25.6

Landings of spiny lobsters in 1961/62 were about unchanged from the preceding year, but shrimp landings rose 43.0 percent to a record total of 9.4 million pounds.

In 1961/62 Western Australia was the leading producer of spiny lobster with 19.2 million pounds (whole weight). New South Wales received the most variety of fish and shellfish including about all the oyster catch. (Fisheries Newsletter, March 1963.)

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TUNA FISHERY TRENDS, JANUARY 1963:

The New South Wales 1962/63 tuna fishery season, beset with severe weather, ended on January 7, 1963, with landings of about 1,491 short tons. This amount was 246 tons below the 1,737 tons landed in the 1961/62 season, and 759 tons below the record of 2,250 tons landed in the 1960/61 season.

The tuna fishery in South Australia was off to a good start this season with about 300 tons landed between January 11-22. As of January 22, there were 18 vessels fishing for tuna. (Australian Fisheries Newsletter, February 1963.)

Table 2 - Australian Landings of Principal Species by State, 1961/62

Item	Queenland	New South Wales	Victoria	South Australia	Western Australia	Tasmania
			(1,000 Lbs.)			
Australian salmon	-	1,384	-	1,050	5,543	2,921
Barracouta	-	-	4,725	-	-	2,061
Flathead	-	3,940	2,318	-	-	-
Morwong	-	2,368	-	-	-	-
Mullet	4,471	5,880	-	-	1,244	-
Shark	-	1,667	3,917	1,581	-	-
Snapper	-	1,803	-	-	1,072	-
Tailor	1,287	-	-	-	-	-
Tuna	-	3,131	-	7,420	-	-
Whiting	-	-	-	1,675	-	-
Crab	625	190	-	-	-	-
Shrimp	1/4,400	1/4,678	-	-	1/239	-
Spiny lobsters	-	1/384	1/1,676	1/4,025	1/19,238	1/3,426
Oysters	-	12,204	-	-	-	-

1/Landed weight.

Canada

BRITISH COLUMBIA COMMITTEE REPORTS ON FISHING LIMITS AND JAPANESE PARTICIPATION IN HALIBUT FISHERY:

According to a Vancouver, B.C., newspaper, the Special Fisheries Commmittee of the Provincial Legislature has filed a report in the House (Victoria) suggesting that the Federal Parliament in Ottawa not consider ratifying the amendment to the North Pacific Treaty that permits Japanese fishing for halibut in the Eastern Bering Sea, until all British Columbia fishing and conservation groups have been heard. The Committee also urges that the British Columbia fishing boundary be extended to 12 miles from headland to headland baseline excepting areas where the United States has "historical reciprocal fishing rights."

The Committee says it found basic agreement by all segments of industry on the "pressing need to amend the now obsolete 3-mile limit," and recommends Canada to take unilateral action in the matter. The newspaper also reported that the External Affairs Minister was scheduled to meet with Fisherman's Union delegates in Vancouver on March 28 to hear the Union's objections to Japanese halibut and herring fishing in nearby waters. (United States Consul, Vancouver, March 28, 1963.)

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FISHERY PRODUCTS EXPORTS LOWER IN 1961:

In 1961, Canada's fisheries export earnings were the third highest among the fish-exporting nations. Canadian international trade in fish and fish products, however, declined steadily from 1958 to 1961. The exports of fishery products in 1961 amounted to 264,800 tons valued at US$137.4 million, the lowest in four years.

According to figures gathered by the Food and Agriculture Organization (FAO), in 1958 Canada exported 282,800 tons of fishery products valued at $156.7. In 1959, exports amounted to 287,800 tons valued at $151.2 million, and in 1960 exports were down to 275,100 tons valued at $141.1 million.

Only Japan (who also led the world in total landings with a record 6.7 million tons) and Norway earned more in 1961. The Japanese exports in 1961 totaled 415,700 tons valued at $188.2 million and the Norwegians exported 455,900 tons valued at $139.0 million. (Food and Agriculture Organization, Rome, April 14, 1963.)

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FISHING VESSEL CONSTRUCTION AIDED BY SUBSIDY PROGRAM:

According to a statement by the Canadian Minister of Transport shipbuilding under the Government's construction subsidy policy, a total of 268 vessels (valued at about C$200 million), have qualified for the subsidies. These include only three deep sea ships; all the other being lakers, coastal vessels, fishing vessels, and miscellaneous craft. The actual commitment of funds as of February 25, 1963, under the ship construction assistance regulations is understood to be about $22 million. Vessels of all types constructed under the Government subsidy program as of late February this year were valued at about $80 million.

The ship construction assistance program which was announced in May 1961 by the Government and actually did not begin to operate until about six months later together with the older Canadian Vessel Construction Assistance Act, which since the mid-fifties has provided special depreciation and tax exemptions, have been credited with an expansion in 1962 of shipbuilding in Canada which temporarily at least has reversed the sharp decline which had characterized the industry over the previous decade. The cutback from 40 to 35 percent in the subsidy rate effective on March 31 under the regulations hastened the flow of last minute subsidy applications.

The Minister of Transport stated that a large number of vessels which have been built or are building, are for use by fishermen. Although Canada is close to fishing grounds and trawlers are used extensively by Canadians, the first trawler built in Canada was in 1962. A large number of wooden fishing vessels are now being constructed. At the present time, one yard has 16 fishing vessels under construction--enough work to keep that yard busy for two years.

Special vessels are planned for participating in tuna fishing, which has proven of immense economic benefit to the United States and Japan. Good tuna fishing grounds are actually nearer Halifax than California.

Canada (Contd.):

Subsidy applications for which agreements have been fully executed since October 5, 1962, included 23 fishing vessels (mostly trawlers) and 3 accessory type vessels (2 barges and one fish camp). Subsidies granted for the fishing vessels amounted to C$3,575,000 and for the accessory vessels, $37,000. These subsidies for fishing vessels and related vessels amounted to about 26 percent of the $14,147,000 granted for all types of craft since October 5, 1962. (United States Embassy, Ottawa, March 19, 1963.)

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LONG-RANGE PROSPECTS FOR EXPORTS OF FROZEN FISH TO EUROPE PROMISING:

A Canadian Frozen Fish Trade Mission to Europe in October 1962 explored the current and long-range market possibilities for Canadian frozen fisheries products in Great Britain, France, Italy, and West Germany. The Mission was sponsored by the Canadian Department of Trade and Commerce. The following summary of the Mission's views and conclusions was prepared by the Department's Fisheries Division Chief.

The objectives of the Mission were: (1) to explore current and long-term market possibilities for Canadian frozen fisheries products in Britain and other outlets in Europe; (2) to become acquainted with the market preferences, and the measure of competition from other exporting countries; and (3) to visit the fish markets, wholesale and retail outlets, and processing plants of frozen fish in Britain, France, West Germany, and Italy, as well as the salt fish trade in both France and Italy.

The Mission members were able to visit fish processing facilities and plants; fresh and frozen fish, wholesale and retail markets; and discuss problems of mutual interest with the leading producers and importers of fish in these major European fish producing and consuming countries. They also had the opportunity of seeing and examining frozen fish products of competitor countries on sale in supermarkets and other retail outlets in Britain, France, West Germany, and Italy--and to gain firsthand knowledge respecting consumer acceptance of Canadian frozen fisheries products vis-a-vis those put up by other fish supplying nations.

Restrictions on the import of frozen fish into Britain were removed in 1959, and it appeared that a new and promising outlet for exports of frozen fisheries products had developed. During the war and pre-war periods, Britain purchased substantial quantities of frozen fish from Canada including salmon and halibut. In 1960, important sales of frozen cod fillets and blocks were also made there, and these exports increased from 1.1 million pounds to over 6 million pounds in 1961. Consequently, the principal port of call was in Britain. However, in view of the recent advances being made in the "cold chain" (refrigerated storage and transportation from the time the fish is frozen until it is sold at retail) in France, West Germany, and Italy, an on-the-spot appraisal of the position was warranted there as well.

All of the countries visited are major fish producing nations, and primarily fresh fish consumers. Over 80 percent of the total landings of demersal fish in Britain (including both domestic and foreign) is used in the fresh form. The bulk of the landings of fish in France, West Germany, and Italy is also consumed in the fresh state.

However, rapid strides are being made in the expansion of available refrigeration facilities. In Britain, for example, the production of quick frozen fish increased from 37,000 tons in 1957 to 56,000 tons in 1961, and imports of frozen fish advanced from 3,685 tons to 20,445 tons. About 44 million pounds of frozen fish fingers (sticks) were put up in Britain last year. The producers indicated that this was merely a start.

The French Government is placing emphasis on increasing the consumption of frozen fillets which, it is estimated, will increase by 5,000 to 10,000 tons per year. This will entail the installation of some 2,500 to 5,000 refrigerated cabinets for the sale of frozen fish at the retail level during the next four years, as well as a corresponding growth in all "cold chain" equipment.

A similar trend is developing in West Germany where there were only 3,000 deep freezing chests available in 1955. These facilities for frozen fish rose to 40,000 in 1960 and to 50,000 in 1961. Indications are that there are presently some 175,000 retail stores in West Germany with only 70,000 deep freezer chests, but it is estimated that by 1963 over 100,000 units will be in operation there.

Italy, too, is conscious of the growing demand for frozen fish or convenience packaged products. One leading Italian producer hopes to increase production from 2,000 tons of frozen fish currently being put up to 10,000 tons by 1970. At present, this individual firm imports 5,000 tons of frozen fish annually.

The Mission found that there is an exceptionally strong demand for Canadian frozen salmon in Britain and France, and considerable interest in West Germany and Italy as well. Frozen halibut is a popular item in Britain and some progress may be made in selling this product in France. The consumption of frozen eels in Europe is increasing, and Canadian producers should have little trouble in marketing good quality eels in any of the markets visited. West German importers, in particular, are anxious to obtain additional supplies. Inquiries were also received for frozen monkfish (angler or allmouth) and porbeagle (mackerel shark) in France and Italy where those species of fish are gourmets' delights; monkfish and porbeagle are available in our Atlantic Coast waters. Heretofore, they have not been taken by Canadian fishermen because of the lack of demand for such fish in North American markets.

While Canadian exporters were able to sell important quantities of frozen cod fillets and blocks in Britain in 1961, current returns, it appears, are below those received from importers in the United States. There was keen interest in obtaining quotations on supplies of Canadian frozen fillets in each of the various markets. Our frozen fillets are recognized as quality products because of the rigid inspection procedures and the proximity of our fish plants to the major fishing banks or grounds.

Retail prices in Britain, France, West Germany, and Italy are considerably higher than those in the United States market, despite the relatively lower prices being paid for frozen fillets at the import level. The long-term prospects for exports of important quantities of frozen fillets to the countries visited are encouraging, particularly in the light of prices the consumers are prepared to pay, and the rising costs of production in most European fish producing countries.

At the present time, the quality of frozen fisheries products originating in Iceland, Norway, and Denmark is comparable with that of similar Canadian products. However, on the assumption that the trend towards freezing at sea continues in European countries, the quality of the frozen fisheries products available to consumers there can be expected to improve.

In view of the uncertainty of the prospects for Britain's entry into the European Common Market and the effects such entry might have on the Common External Tariff, the

Canada (Contd.):

Mission did not devote much discussion to this particular question. While importers in France, West Germany, and Italy did not seem unduly disturbed about the implication of the Common External Tariff as it now exists, should Britain enter the European Common Market the duty on imports of frozen fillets and blocks into Britain from Commonwealth countries would gradually rise from zero to a proposed rate of 18 percent. In the immediate short term, the rate of duty imposed may not be too serious. However, in order to insure that the potential trading opportunities are fully realized, it would be important to have a minimum tariff barrier on access of frozen fish to Europe.

The industry members of the Mission will report their findings to exporters of frozen fish in their individual provinces. (Canadian Fisherman, March 1963.)

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HORMONE TREATMENT MAY HASTEN ATLANTIC SALMON'S SEXUAL MATURITY: An exploratory investigation into the physiology of the Atlantic salmon was undertaken in 1962 by the Halifax Technological Station of the Fisheries Research Board of Canada. The purpose of the study was to determine whether the sexual maturity of the female salmon can be artificially induced. Scientists hope to increase the spawning incidence of both male and female salmon.

The investigation of Atlantic salmon is related to studies made of the Pacific salmon during the past few years. After spawning, the five species of Pacific salmon die. On the other hand, the Atlantic salmon frequently survives spawning.

Studies of the Pacific salmon disclosed a metabolic impairment of hormones after spawning. It has now been shown that there is no such impairment in Atlantic salmon. It is believed that the metabolic change in Pacific salmon is an indicator of approaching death and is not connected with the act of spawning.

As a result of the hormone studies on the Pacific species, scientists have found it is possible to hasten the development of eggs in the female, and secondary sex characteristics in the male. This is done by artificially inducing a high level of certain hormones normally present at spawning.

A number of female salmon which spawned early last fall were held in salt water by the Halifax station. Under natural conditions, a spawned salmon remains in fresh water throughout the winter and returns to salt water in the spring. During the interval in fresh water, when it normally doesn't eat, it loses its bright colors and returns to the sea in an emaciated condition.

The salmon held in salt water at the Halifax station showed a marked contrast to stocks wintering in fresh water. The captive salmon were rapidly regaining their sleek, silvery appearance. Scientists planned to introduce synthetic hormones into their bodies once they had started to eat and their physical condition had reached a satisfactory level. The hormones are placed in tiny pellets which can be inserted beneath the skin and gradually absorbed by the salmon.

The scientists plan to perform the same experiment with male salmon. They will be held in captivity after spawning and the same process will be used to hasten their sexual maturity.

Once the captive salmon have entered into the reproductive stage, they will be stripped of their eggs and milt. An attempt will be made to keep the sperm in a frozen state until it can be used to fertilize the eggs. From then on, the operation would become one for the hatcheries. Eggs would be raised in the hatcheries to the parr or smolt stage and then transplanted into fresh water streams to follow their destiny, which takes them to unknown reaches in the oceans and back again to fresh water to spawn.

Stacks of trays containing salmon eggs being lowered into a deep-type trough for the period of incubation.

Scientists feel the experiment has possibilities. If sexual maturity can be hurried, then spawning can be increased and egg production multiplied. (Canadian Fisheries News.)

Chile

FISH CONSUMPTION INCREASES IN SANTIAGO:

Fish consumption of over 18,000 metric tons in Santiago, Chile, in 1962, was 41 percent above the 12,800 tons consumed in 1960, according to the Commission for the Development of Fisheries. A still greater increase is anticipated in 1963 when a fish terminal with wholesale marketing facilities is expected to open in Santiago.

The growth in fish consumption in Santiago is due mainly to the improved quality of fish reaching retail outlets. Shippers have been using ice on fresh fish trucked into Santiago from the coast. In addition, frozen fillets of select fish have moved into the market. The law, effective in mid-1962, which prohibited the sale of beef in public eating places each Wednesday also influenced fish consumption. (United States Embassy, Santiago, March 9, 1963.)

Cuba

PLANS FOR NEW FISHING PORT:

Work on the fishing port planned for Havana, Cuba, was due to begin early in 1963 and be completed within a year, according to the Cuban Government. A refrigeration expert from Edinburgh, Scotland, has signed a five-year agreement with Cuba to supervise construction of the new port for Cuban and Russian fishing vessels. He said the first building materials would be delivered from Russia and Bulgaria.

A statement issued by the Cuban Government when the contract with the Scottish expert was signed, declared that the new port would be able to handle 180 vessels, including 130 Russian fishing vessels. It will have repair facilities for vessels of up to 2,500 tons. A factory at the base will be able to process 180,000 tons of fish a year. (Fish Trades Gazette, January 26, 1963.)

Note: See Commercial Fisheries Review, November 1962 p. 62.

Denmark

FISH FILLETS AND BLOCKS AND FISHERY INDUSTRIAL PRODUCTS EXPORTS, JANUARY 1963:

Denmark's total exports of fresh and frozen fish fillets and blocks during January 1963 were 83.3 percent above exports in the same month in 1962--herring fillets up 251.7 percent; flounder and sole fillets up 32.7 percent; and cod and related species up 18.1 percent. Of the total exports, about 445,000 pounds (mostly cod and related species) were shipped to the United States in January 1963 as against 210,000 pounds in the same month in 1962. The leading buyer of frozen fillets in January 1963 was West Germany with 45.4 percent of the total, followed by the United Kingdom with 14.7 percent.

Denmark's Exports of Fresh and Frozen Fish Fillets and Blocks and Fishery Industrial Products, January 1963 1/

Product	January		Jan.-Dec.
	1963	1962	1962
	....(1,000 Lbs.)....		
Fillets and Blocks:			
Cod and related species	2,181	1,847	28,658
Flounder and sole	2,503	1,886	28,255
Herring	4,516	1,285	27,511
Other	67	36	678
Total	9,267	5,054	85,102
	... (Short Tons) ...		
Industrial Products:			
Fish meal, fish solubles, and similar products	4,259	3,362	69,623

1/Shipments from the Faroe Islands and Greenland direct to foreign countries not included.

During January 1963, Denmark's exports of fish meal, fish solubles, and similar products were 26.7 percent above the amount shipped out in the same month of 1962. The principal buyers were the United Kingdom and West Germany.

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SOVIET FLEET FISHING OFF NORTH SEA COAST:

Near the end of February 1963, a large Soviet fishing fleet had anchored off the small Danish fishing port of Lønstrup on the North Sea coast of Jutland, and was conducting a comprehensive fishery, according to newspaper reports. The fleet consisted of 2 cannery factoryships and 10 fishing vessels. The latter were supplied fuel by a tanker. (Regional Fisheries Attache for Europe, U. S. Embassy, Copenhagen, March 13, 1963.)

France

ARBITRATION PROPOSED FOR SPINY LOBSTER FISHING DISPUTE WITH BRAZIL:

The International Court of Justice has confirmed the willingness of the French Government to submit their dispute with Brazil over spiny lobster fishing rights to arbitration, according to newspaper reports in The Hague on April 2, 1963. The press announced that the Court had forwarded the French statement to Brazil and had promised full cooperation should the parties wish to make use of the International Court of Justice to settle the dispute. (United States Embassy, The Hague, April 6, 1963.)

The dispute involves the rights of French fishing vessels to take spiny lobsters from international waters over the continental shelf adjacent to Brazil. The Brazilians say that the spiny lobsters live on the ocean bottom and are thus part of their country's resources on, or in the continental shelf. The French contend that the spiny lobsters are sometimes water borne and that as such, can be fished by anyone in international waters.

The dispute was sharpened in late February 1963 when six French fishing vessels off Brazil were ordered to leave the area by Brazilian authorities. They refused and the French Government sent a destroyer escort to the scene. Later, on March 9, 1963, France ordered the six French vessels and their naval escort to leave the area.

Ghana

SOVIET-BUILT FISHING VESSEL DELIVERED:

A Ghanaian fishing firm with headquarters at Tema took delivery on March 2, 1963, of a ŁG193,500 (US$541,800) freezer-trawler built at Kiev in the Soviet Union. Named The Pioneer, the 927-ton vessel (176 feet) was reported to have storage space for 150 to 160 metric tons of fish and a daily freezing capacity of 6 tons. It was said to have accommodations for a crew of 32, and a maximum speed of 11½ knots per hour. The Ghanaian press reported that 4 technicians and 3 fishermen from Ghana were included in the crew which brought the ship to Tema. Apparently Soviet personnel will be largely responsible for the vessel's operation.

The Pioneer is the second Soviet ship delivered to the Tema firm. The first, a smaller fishing vessel which cost ŁG30,000 ($84,000), was delivered in August 1962. Another private fishery firm in Ghana placed an order recently with Sudoimport, a Soviet organization, for delivery of a ŁG170,000 ($476,000) trawler in 1964.

The Ghanaian Ministry of Agriculture placed a ŁG1,670,000 ($4,676,000) order with Sudoimport in August 1961 for ten fishing trawlers, the first of which was expected to be delivered in June 1963. Those ten vessels will be operated by the Ghana Fishing Corporation. (United States Embassy, Accra, March 5, 1963.)

Guatemala

JOINT JAPANESE-GUATEMALA SHRIMP FISHING VENTURE:

The joint Japanese-Guatemalan shrimp fishing company established at Champerico, Guatemala, in 1961 is now reported to be in full operation. The joint company's shrimp fleet consists of 32 vessels, 20 of which the company owns. March 1963 reports indicate that fishing was good and annual shrimp production is expected to total about 2 million pounds heads-off.

The joint company began operations in November 1961 and started with a fleet of eight vessels. For the period November 1961 through December 1962, the company produced about 1.3 million pounds of shrimp (heads-off), which were shipped mostly to Los Angeles and New York at prices averaging 95 U. S. cents a pound f.o.b. Champerico.

Base facilities at Champerico include a 100-ton capacity refrigerated plant and a quick-freeze unit of 12.5-ton capacity. (Suisan Tsushin, March 11, 1963.)

Iceland

FISHERIES LANDINGS, 1962:

Landings of fish and shellfish for 1962 in Iceland were about 820,000 metric tons as compared to 710,000 tons for 1961, an increase of 17 percent. The excellent 1962

Iceland (Contd.):

herring landings of 473,000 tons (329,000 tons in 1961) were chiefly responsible for the increase in 1962. The extended season (almost year round now), locating new fishing grounds, use of electronic detection equipment, and possibly a peak in herring abundance all contributed to the increased herring landings. Groundfish landings, however, were only 346,000 tons as compared to 381,000 tons in 1961. Bad weather last spring, the long trawler tie-up, and a drop in landings of ocean perch all contributed to the decrease.

Fig. 1 - Fresh cod being unloaded in net from fishing boat into truck at main fishing pier.

The trawlers' share of the 1962 landings dropped to 5 percent, whereas previously they landed as high as 40 percent of the catch. While part of this decline resulted from the vessel tie-up, which lasted from March 10 to July 5, 1962, the Minister for Fisheries claims that the primary reason is the exclusion of trawlers from the fisheries limits. Although exclusion of trawlers from waters within the 12-mile limit has resulted in financial problems for trawler owners, it has also resulted in a definite improvement of fish stocks around Iceland, according to an Icelandic biologist.

Total production of frozen fish in Iceland's 90 freezing plants during 1962 was 82,000 tons, of which 45,500 tons were frozen fish fillets (excluding herring). A breakdown follows of the different varieties of frozen fish fillets, which account for 25 percent of Iceland's total exports: cod 23,912 tons (25,275 tons in 1961); haddock 10,002 tons (9,598 tons in 1961); wolffish 3,049 tons (2,815 tons in 1961); ocean perch 3,752 tons (6,248 tons in 1961), coalfish

Fig. 2 - Trimming and packing fillets in an Icelandic fish processing plant.

1,431 tons (1,263 tons in 1961; and ling 798 tons (164 tons in 1961).

A great increase in the freezing of herring has occurred in recent years and accounts for the increase in total frozen fish production. In 1962, frozen herring amounted to 25,500 tons as compared to 3,733 tons as recently as 1960.

Fig. 3 - An Icelandic fishing harbor, showing vessels at dock and processing plant.

Statistics on other major types of fish production in 1962 are as follows: herring oil 63,000 tons; herring meal 72,000 tons; shrimp and lobster 2,900 tons. Whale production also increased significantly in 1962--480 whales as compared to 350 in 1961. (United States Embassy, Reykjavik, March 1, 1963.)

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FISH OIL USED IN PAINTS:

During past years the Research Institute of the Fisheries Association of Iceland has experimented with using fish oils from saithe

Iceland (Contd.):

(pollock) and haddock in the manufacture of paints. This research has been successful and considerable quantities of paints have been produced on this basis for experimental purposes. It is anticipated that an Icelandic paint firm will start commercial production of such paints in the near future.

The oil, which replaces linseed oil, will also be used to produce varnish. In 1962, Iceland imported 207.3 metric tons of linseed oil. Most of this oil has been used for paint production. (U. S. Embassy, Reykjavik, February 21, 1963.)

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EXPORTS OF FISHERY PRODUCTS, 1962:

During 1962, there was a considerable increase in exports of frozen herring, frozen fish fillets, salted herring, herring oil, herring meal and frozen whale meat as compared with 1961, according to the Statistical Bureau of Iceland's Statistical Bulletin, February 1963. Exports of fish meal, ocean perch meal, frozen fish waste, lobster and shrimp meal, whale meal, and salted fish showed a considerable decrease in 1962

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FIRM GRANTED PERMISSION TO EXPORT SALT FISH:

An independent Icelandic exporter has been granted official permission to export a large quantity of salt fish (excluding herring) to Italy and other countries. The exporter will represent 12 salt-fish producers whose output in 1962 was 1,500 metric tons (about 5 percent of the total salt-fish exports) of which 700 tons were exported at reportedly favorable

Icelandic Fishery Exports, 1962 with Comparisons

Product	1962			1961		
	Qty.	Value f.o.b		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Salted fish, dried	3,184	64,012	1,485	4,646	88,463	2,176
Salted fish, uncured	26,670	321,297	7,454	29,109	297,328	7,314
Wings, salted	1,045	12,032	279	1,324	12,313	303
Stockfish	10,654	281,274	6,526	10,674	258,751	6,365
Herring on ice	7,022	23,773	552	6,025	17,408	428
Other fish on ice	30,864	167,999	3,898	33,519	176,556	4,343
Herring, frozen	24,126	132,512	3,074	14,456	69,695	1,714
Other frozen fish, whole	2,883	37,201	863	2,819	33,665	828
Frozen fish fillets	50,200	884,272	20,515	41,784	660,379	16,245
Shrimp and lobster, frozen	420	44,508	1,033	507	41,663	1,025
Roes, frozen	720	13,680	317	607	8,472	208
Canned fish	429	23,136	537	373	22,336	549
Cod-liver oil	5,313	40,994	951	5,949	47,278	1,163
Lumpfish roes, salted	449	6,823	158	536	9,039	222
Other roes for food, salted	2,746	37,936	880	2,546	25,800	635
Roes for bait, salted	1,407	8,831	205	1,348	8,131	200
Herring, salted	47,290	469,008	10,881	33,738	329,044	8,094
Herring oil	60,478	241,755	5,609	25,000	132,479	3,259
Ocean perch oil	15	61	1	981	4,919	121
Whale oil	1,687	13,660	317	1,540	11,800	290
Fish meal	20,230	126,736	2,940	28,693	119,105	2,930
Herring meal	48,489	314,420	7,295	37,583	203,581	5,008
Ocean perch meal	437	2,451	57	3,735	17,003	418
Wastes of fish, frozen	7,168	18,853	437	12,283	22,231	547
Liver meal	320	2,129	49	345	2,023	50
Lobster and shrimp meal	212	846	20	395	1,058	26
Whale meal	602	3,286	76	1,493	5,769	142
Whale meat, frozen	2,484	18,689	434	1,620	11,631	286

Note: Values converted at rate of 1 kronur equals 2.32 U. S. cents in 1962 and 2.46 U. S. cents in 1961.

Iceland (Contd.):

prices. (United States Embassy, Reykjavik, February 21, 1963.)

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TRADE AGREEMENT WITH HUNGARY INCLUDES FISHERY PRODUCTS:

A protocol for bilateral trade between Iceland and Hungary was signed on February 5, 1963, for a period of about one year ending December 31, 1963. The agreement allows for an exchange of Ł140,000-150,000 (US$392,000-420,000) worth of products each way. Iceland will undertake to export up to Ł30,000 ($84,000) worth of fish fillets, an undetermined amount of salt and frozen herring, small quantities of wool and sheepskins, canned fish, and fish meal. The products to be imported from Hungary do not include any fishery products. (United States Embassy, Reykjavik, March 15, 1963.)

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UTILIZATION OF FISHERY LANDINGS, JANUARY-OCTOBER 1962:

How Utilized	January-October	
	1962	1961
	. . .(Metric Tons) . . .	
Herring[1]/ for:		
Oil and meal	330,953	184,447
Freezing	18,194	12,198
Salting	55,515	56,164
Canning	336	114
Groundfish[2]/ for:		
Fresh on ice landed abroad	29,379	28,744
Freezing and filleting	125,478	133,359
Salting	68,768	65,701
Stockfish (dried unsalted)	33,767	44,581
Home consumption	11,583	9,560
Oil and meal	2,929	3,414
Total production	676,902	538,282

1/Whole fish.
2/Drawn fish.

Iran

UNITED STATES LEADING IMPORTER OF CAVIAR IN 1961/62:

For the first time in the history of Iran's sturgeon fishery, the United States in the "fishing year" that ended April 1962, led all other countries as an importer of sturgeon roe or caviar. Exports to the United States in 1961/62 amounted to 56 metric tons as compared with 46 tons exported to the Soviet Union. The western European countries collectively, imported 58 tons, and 10 tons were consumed in Iran.

Sales of Iranian caviar to the United States are based on bids resulting in a contract between the National Iranian Fisheries Company and a private United States trading firm. (United States Embassy, Tehran, February 11, 1963.)

Israel

JOINT ISRAELI-NORWEGIAN FISHING COMPANY FORMED:

A joint Israeli-Norwegian deep-sea fishing company has been formed with the establishment of a partnership between a Haifa fishing company and a Norwegian fishing firm. The new company will fish off West Africa and in the North Sea and plans to market its catch in Israel and Mediterranean and African countries.

In 1962, Israeli per capita fish consumption reached 9.7 kilograms (about 21.3 pounds). The Israeli landings in 1962 totaled 16,400 metric tons, an increase of 1,500 tons over 1961. (United States Embassy, Tel Aviv, March 15, 1963.)

Italy

QUOTA INCREASED ON DUTY-FREE IMPORTS OF FROZEN TUNA:

The Italian Government fixed the nontaxable quota of tuna imported from countries other than members of the European Economic Community (EEC) as 25,000 metric tons in 1962. At the request of the tuna canners, it announced an increased quota of 32,000 tons for 1963. Any quantity in excess of that quota is subject to a 7.5 percent duty.

The Italian Canners Association appears satisfied with the decision but is expected to ask EEC headquarters in Brussels, Belgium, for the establishment of an additional quota of 6,400 tons.

In this connection, the canners in Italy asked Japan whether such a large amount could possibly be supplied. At the same time they expressed their dissatisfaction over the

Italy (Contd.):

fact that Japanese products are much higher priced than those of South Africa, Australia, and the former French colonies, and that more big-eyed tuna than other species are found in the Japanese shipments. (Suisan Tsushin, February 27, 1963.)

Ivory Coast

TERRITORIAL WATERS EXTENDED TO 12 MILES:

Meeting in extraordinary session March 20, 1963, the Ivory Coast National Assembly passed unanimously, except for one abstention, a completely revised National Property Code. One of the provisions of the new Code extends territorial waters from 3 to 12 miles. The controversial reforms contained in the law evoked spirited and at times acrimonious debate. However, the article incorporating the change in definition of territorial waters was not even discussed. The Assembly rapporteur stated simply that the extension "takes into account the interests of both trawlers and tuna fishermen." (United States Embassy, Abidjan, March 22, 1963.)

Japan

CANNED TUNA PRODUCTION AND EXPORT REGULATIONS, FY 1963:

The Japan Marine Products Export Promotion Council, a Government agency responsible for the drafting of ordinances to regulate the flow of certain export commodities for the purpose of maintaining orderly marketing abroad, held its 14th meeting on March 14. At the meeting, the Council agreed to add whale oil to the list of fishery products under export control, of which there presently are twelve. They are canned tuna in brine, other canned tuna, frozen tuna, frozen swordfish, canned sardine, canned saury, fish liver oil, agar-agar (natural), agar-agar (industrial), canned crab, canned salmon, and canned jack mackerel.

The Council also deliberated the establishment of an ordinance to regulate sales of canned tuna for export (to the United States) for fiscal year 1963 (April 1963-March 1964). This proposed ordinance, which was expected to go into effect on April 1, is summarized as follows:

Restrictions on Methods of Sales: (1) Packers of canned tuna, in selling their products, must consign their production to the Tokyo Canned Tuna Sales Company. However, this provision does not apply to packers who, with the approval of the Minister of Agriculture and Forestry, are clearly engaged in the production of canned tuna for domestic consumption. (2) Packers applying for approval to pack tuna for domestic consumption in accordance with the provision of Item 1 must submit to the Minister of Agriculture and Forestry an application specifying the destination of their shipment, the kind and price of pack, and packing date, accompanied by a document certifying that their canned tuna will be sold only for domestic consumption. (3) Packers must first obtain approval of the Minister of Agriculture and Forestry if they wish to cancel their consignments to the Tokyo Canned Tuna Sales Company.

Restrictions on Production of Canned Tuna for Export: (1) Tuna packers (newly licensed to pack canned tuna for export in FY 1962) with production records of less than 500 cases (for export) during FY 1962 (April 1962-March 1963) shall be permitted to pack a total of 500 cases of canned tuna for export during FY 1963. (2) Established tuna packers (not including those in the preceding category) with production records prior to March 31, 1963, shall be permitted to pack for export a combined total of 340,000 cases during the period April 1-June 30, 1963; 680,000 cases during the period July 1-December 31, 1963; and 850,000 cases during the period January 1-March 31, 1964, provided that the daily production of each packer in this category does not exceed 500 cases. (Note: Production allotment for the three periods totals 1,870,000 cases. As such, they are believed not to include unassigned quota.) (3) Tuna packers without records of having produced canned tuna for export prior to March 31, 1963, shall be licensed to pack a combined total of up to 5,000 cases of canned tuna for export in FY 1963. Applications submitted by packers in this category shall be processed in the order that they are received.

Quantity of canned tuna for export that can be packed by June 30, 1963, by each (qualified) established packer is 4,500 cases and by each newly licensed packer 500 cases.

Quantity of canned tuna for export that each established packer in the following categories can pack (for FY 1963) is as follows: (1) Packers with no production record prior to FY 1955 but with four years of production since FY 1956, 2,000 cases. (2) Packers with no production record prior to FY 1955 but with three years of production since FY 1956, 1,500 cases. (3) Packers with no production record prior to FY 1955 but with two years of production since FY 1956, 1,000 cases. (4) Packers with no production record prior to FY 1955 but with one year of production since FY 1956, 500 cases.) (Suisan Keizai Shimbun, March 15, 1963.)

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EXPORTS OF CANNED TUNA IN OIL AND SPECIALTY PACKS, 1962:

According to the Japan Export Tuna Packers Association, the canned tuna in oil approved for export during April-December 1962 was 1,021,295 actual cases, about 11 percent less than the 1,146,805 cases exported in a similar period of 1961. During 1962, 1,387,885 cases were exported, only 20,000 cases less than the 1,406,527 cases exported in 1961, but an increase of 20 percent over the 1,164,346 cases exported in 1960.

Canned tuna exports other than in oil or brine totaled 337,586 cases (including 69,038 cases of jelly tuna, 257,455 cases of vegetable tuna, 8,075 cases of tuna in tomato sauce, 1,550 cases of tuna in curry sauce, and 1,468 cases of other packs) for the period April-December 1962, almost twice as much as the 168,447 cases exported in the same period

Japan (Contd.):

of 1961. (Suisan Tsushin, February 20, 1963.)

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EXPORT PRICES FOR JAPANESE CANNED TUNA IN BRINE REVISED:

The Tuna Standing Committee of the Japan Canned Foods Exporters Association, at a meeting held on March 28, 1963, is reported to have decided to raise again the export price of canned white meat tuna in brine, this time by 30 cents per case (48 7-oz. cans/case) to $10.40 per case f.o.b. Japan. It plans to maintain the existing export price ($7.60 per case) for canned light meat tuna in brine.

The new prices would affect the April sale of canned tuna in brine. For the April sale, the Tuna Standing Committee planned to offer 110,000 cases of white meat tuna and 90,000 case of light meat tuna. The 200,000 cases were to be loaded for shipment to the United States in April and May.

For the March sale (90,000 cases of white meat tuna and 60,000 cases of light meat tuna), the Tuna Standing Committee had raised the export price of canned white meat by 20 cents per case. Thus, within a one-month period, the Committee has voted two increases in prices for white meat tuna, totaling 50 cents per case. The Committee for the February sale had lowered the price of canned white meat tuna in brine to $9.90 a case. (Nihon Suisan Shimbun, April 1, 1963.)

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OPERATIONS OF TUNA CANNERIES IN PUERTO RICO REVIEWED:

Two more United States tuna canneries will be in full operation in Puerto Rico in 1963, in addition to the two United States tuna canneries already established, according to a report by the Japanese Export Trade Promotion Association. The raw tuna required by those four plants will total 445-485 tons per day with storage facilities expected to reach 8,600 tons.

In 1962, the two established plants received tuna amounting to 56,389 tons, of which 18,745 tons (33.2 percent of the total) were imported from Japan, 18,078 tons came from Peru and Ecuador, and landings by United States purse seiners amounted to 13,246 tons.

Large quantities of tuna arrived in Puerto Rico in the summer of 1962. A total of 7,000 tons was received in July, 6,000 tons in August, and 6,300 tons in September which greatly exceeded Puerto Rican production and storage capacities. During that period a sharp drop in export price of frozen tuna to the United States occurred.

Also, in 1963, Peru and Ecuador will be making an effort to build new vessels and increase their tuna fishing fleets. According to the Japanese Association 85 percent of the tuna exports by the two countries are shipped to Puerto Rico (concentrated in June-September). It is generally anticipated that landings of tuna in Puerto Rico for the tuna canneries will surpass those of last year. (Suisan Tsushin, February 23, 1963.)

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EXPORT PRICE FOR FROZEN ALBACORE HIGH IN MARCH 1963:

The export price of frozen albacore tuna in mid-March 1963 was up sharply from the low level of December 1962 and by mid-month was approaching the record high of US$405 a short ton f.o.b. Japan set in the early postwar days.

A Japanese newspaper commenting on the firm market for frozen albacore states that the sharp price increase indicated a firm market in the United States. The same source also states that the albacore fishing season in both the Atlantic and Indian Oceans was over, and that the poor catches of albacore from the Indian Ocean aggravated the tight supply situation. This source also predicted a poor albacore fishing season in waters near the Japanese coast and that the tuna canners will probably bid up the ex-vessel price. Therefore, the newspaper states, the mid-March albacore price level might persist until August when the United States west coast fishery for albacore gets into high gear.

The mid-March price for frozen yellowfin for export was $330-335 a short ton with demand only fair. (Suisan Tsushin, March 12, 1963.)

At the end of March 1963, another Japanese periodical (Nihon Suisan Shimbun, March 29, 1963), reported that the prevailing export price for frozen albacore tuna f.o.b. Japan was $410 a short ton.

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Japan (Contd.):

PRICES LOWER FOR ATLANTIC-CAUGHT FROZEN TUNA:

Japanese press reports indicate that Atlantic Ocean-caught albacore tuna are currently being exported to the United States at a much lower price than albacore exported directly from Japan proper. The late March 1963 export price of Atlantic-caught albacore tuna transshipped to the United States was quoted at $350 per short ton, and that for Atlantic-caught yellowfin tuna at $325 per short ton (20-100 pounds, gilled and gutted), f.o.b. Las Palmas, Canary Islands. In comparison, the price of albacore tuna exported directly from Japan to the United States was quoted at $400-410 per short ton and yellowfin tuna at $335-340 per short ton. (Suisan Tsushin, March 20, 1963.)

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FROZEN TUNA EX-VESSEL PRICES INCREASED:

The demand for frozen tuna in Japan was very strong as of early March 1963. According to Japanese press reports, the ex-vessel price for frozen albacore was increased to 158-160 yen per kilogram (US$398-403 per short ton), and for yellowfin to 145-150 yen per kilogram (US$365-378 per short ton). (Suisan Tsushin, March 12, 1963.)

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FROZEN TUNA EXPORTS FOR FISCAL YEAR 1963 ALLOCATED:

The Japanese Export Frozen Tuna Fisheries Cooperative held its directors' meeting to draft regulations for frozen tuna and swordfish quotas for fiscal year 1963. The following plans were to be presented to an emergency general meeting scheduled for March 8, 1963.

Plans for frozen tuna exports: (1) Direct shipments (including transshipment of mothership tuna at Suva): (a) albacore production quota for the United States and Canada--24,000 short tons, of which 21,600 tons is the fixed base quota, 2,250 tons is the free base, and 150 tons is the reservation quota; (b) the yellowfin production quota for the United States and Canada--36,000 tons, of which 32,400 tons is the fixed base quota, 3,450 tons is the free base quota, and 150 tons is the reservation quota; (c) the loin quota for the United States and Canada--6,000 tons, of which 4,800 tons is the fixed base quota, 1,180 tons is the free base quota, and 20 tons is the reservation quota (when loins are made, 1.5 tons is deducted either from the albacore quota or the yellowfin for every 1 ton of loins); (d) adjustment quota--less than 15,000 tons (when the use of the albacore or yellowfin quota reaches a certain fixed quantity, this quota is made available through a resolution by the board of directors).

(2) Production at sea: (a) the production quota for the transshipment from the Indian Ocean is 4,000 tons with restriction of 150 tons per vessel (in addition, however, transshipment from the Indian Ocean may be made by switching a quantity from the direct shipment quota; (b) production quota for Italy is 14,000 metric tons for the fixed base quota plus the 0.5 voyage quota per vessel; (c) transshipping quota from the Atlantic for the United States and Canada--120 voyages per year (about 35,000 tons); the restriction of the number of voyages per vessel is the same as in the past.

The plan for frozen broadbill swordfish is: production quota--8,500 short tons, of which 5,500 tons is the fixed base quota and 975 tons the free base quota. (Suisan Tsushin, February 25, 1963.)

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TARGETS FOR TRANSSHIPMENT OF ATLANTIC-CAUGHT TUNA, APRIL-JUNE 1963:

The Atlantic Tuna Committee of the Japan Frozen Foods Exporters Association, at a meeting held in Tokyo, was reported to have established the following frozen tuna transshipment targets for April, May, and June 1963. (Shin Suisan Shimbun Sokuho, March 30, 1963.)

Targets for Transshipment of Frozen Tuna from Atlantic Catch, April-June 1963

Destination	April	May	June	Total
	(Short Tons)			
United States	6,650	2,830	3,010	12,490
Italy	4,070	7,320	6,070	17,460
Yugoslavia	1,130	700	600	2,430
Las Palmas, Canary Islands	600	250	250	1,100
Other European countries	340	320	600	1,260
Total	12,790	11,420	10,530	34,740

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TUNA LANDINGS QUOTA INCREASED FOR AMERICAN SAMOA:

On March 15, 1963, the Japanese Fisheries Agency announced that the American Samoa

Japan (Contd.):

tuna landings export quota would be increased from the present 18,000 tons to 27,000 tons. The increased quota of 9,000 tons will be allocated to one of the large Japanese fishing firms and a Japanese fisheries cooperative group. Two Japanese trading firms have negotiated sales contracts with fishing firms. It is believed that all tuna landed under the added quota will be sold to the large United States tuna firm which will build a new cannery in American Samoa. The present tuna landings quota of 18,000 tons is utilized by a cannery owned by another United States firm.

Thirty tuna fishing vessels of the 100-ton class are expected to be diverted from the Japanese coastal tuna fishery to fish for tuna in the American Samoan area. (United States Embassy, Tokyo, March 15, 1963.)

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FISHING BASE IN THE CANARY ISLANDS:

At a press conference held by Japanese representatives who attended the meeting of the International Labor Organization (ILO) Fisheries Committee in Switzerland, conditions at the Las Palmas, Canary Islands, base off the west coast of Africa were explained. It was pointed out that the local industry is showing an unreceptive attitude toward Japan's fishing industry.

Las Palmas is being used as a base for some 40 Japanese pelagic tuna vessels and trawlers. The mild climate and abundant supply of provisions will continue to attract the fishermen as long as catches are good.

Local fishermen are somewhat hostile to Japanese fishing vessels and in many cases there is a difference of opinion on the selling price of fish. But the local government has adopted a friendly attitude toward Japanese fishing vessels because they spend a considerable amount of money in a year's time.

According to vessel operators, tuna and bottomfish catches are declining to about half what they were 4 or 5 years ago. In the case of tuna fishing, one trip is certain in about a 3-month period.

Japan is planning to build recreational and housing facilities in Las Palmas in cooperation with the Spanish Seamen's Society in the near future, and is considering sending a Japanese as supervisor. A study is to be made by the Japan Fisheries Society and Fisheries Agency to reach a conclusion on some type of cooperative setup. (Suisan Tsushin.)

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TUNA LANDINGS QUOTA FOR CANARY ISLANDS CONSIDERED:

The Japanese Fisheries Agency in December 1962 announced a policy permitting the landing of frozen tuna at Las Palmas, Canary Islands, on a base of 2,000 metric tons a year with a partial quota of 700 tons for 4 months applicable to the fiscal year ending March 31, 1963, on condition that the quota would be recognized for local consumption. At the same time a provisional plan of the allocation of the quota for fiscal year 1963 and forward was shown. The plan provided for: (1) landings of 150 tons per vessel a year; (2) monthly landings would be limited to 300 tons; and (3) in case of an application for permission for landing of more than 300 tons in a month, the order of the permission would be determined by lottery. This method would be enforced in coordination with the Export Frozen Tuna Manufacturers Association. The Atlantic Committee of Japan Frozen Food Exporters Association holds that the 2,000 tons a year quota is impracticable. The exporters' association, therefore, in February 1963 filed a representation with the Government requesting a reconsideration. The association wants a temporary export quota of 500 tons for April/May 1963 and the same tonnage for June/July with a provision that in case of excessive applications above the monthly limit, the determination should be made by means of internal negotiation within the membership. This problem is connected with one which has priority, "permission of landing" or "export license" and is watched with interest by the Japanese industry.

The Japanese Export Frozen Tuna Manufacturers Association on March 5 discussed the quantity of Atlantic tuna to be landed at Las Palmas, Canary Islands, and reached an agreement as follows: (1) the landing limit of 2,000 metric tons a year is reacknowledged; (2) the permit should consist of one for both landing by fishing vessels and for export by trading firms; and (3) priority order should be studied every 2 months on the basis of a planning list to be presented from both the fishing vessels and the trading firms, and then determined according to the actual affairs. (Japanese newspapers, February 27 and March 6, 1963.)

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Japan (Contd.):

PLANS FOR TUNA FISHING BASE IN FIJI ISLANDS:

The joint tuna fishery undertaking in the British Fiji Islands is developing steadily. As of mid-February 1963, the jointly owned Pacific Fishing Company was preparing for the establishment of a cold-storage plant and had filed an application for organization of the company. Permission by the Fijian Government was expected by the end of March. If this materialized the Government's Overseas Investment Liaison Committee was to be contacted for its approval, and the construction of the cold-storage plant with a capacity of 3,000 metric tons was expected to begin in May. Japanese officials of the new company were tentatively selected.

Participating fishing vessels will consist of 13 newly authorized vessels, 8 or 9 vessels belonging to the South Pacific Fisheries Cooperative, and 7 or 8 individually owned vessels. Annual landings are estimated at 15,000 tons.

The joint company with permission of the Fijian Government was originally named the Pacific Fishing and Canning Company, but later the Japanese Government was reluctant to include the word "canning." A corrected application omitting the word was filed later. (Suisan Tsushin, February 19, 1963.)

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NEW TUNA FISHING BASE AT NEW CALEDONIA:

One of the largest Japanese fishing companies will establish a joint fishing company with local interests at Noumea, New Caledonia, as soon as a license is issued by the French Government. About 5 million New Caledonia francs (about US$55,556) will be invested in the company--51 percent by the local New Caledonia Development Company, and 49 percent by the Japanese company. Plans call for a cold-storage, freezing, and ice-making plant at Noumea and a start in operations by the end of 1963, as soon as the undertaking is authorized.

The capacity of the plant will be 2,000 tons of frozen products, 70 tons freezing capacity, 70 tons of ice per day, and 200 tons of ice storage. The plant will cost about $1.2 million. Using about 40 vessels of the 100-ton class, tuna fishing will be carried out from the base, and yearly landings of yellowfin and albacore tuna will be about 15,000 tons, of which some 60 percent will be exported to the United States and France. The remaining 40 percent will be shipped back to Japan. (Japanese newspaper, February 20, 1963.)

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VESSELS ENGAGED IN THE SKIPJACK TUNA FISHERY, 1961-62:

As of December 31, 1962, according to the Japanese Fisheries Agency, vessels licensed for skipjack tuna fishing were as follows: 77 vessels, more than 40 tons and less than 70 tons (a decrease of 32 vessels from the previous year); 260 vessels, more than 70 tons and less than 100 tons (a decrease of 40 vessels); and 126 vessels, more than 100 tons and less than 180 tons (a decrease of 53 vessels).

These decreases were the results of supplementing tonnage to enlarge new vessels. The latest number of each tonnage class (1961 is in parentheses) are as follows:

The 40-ton class, 3 (9); 50-ton class, 5 (13); 60-ton class, 69 (87); 70-ton class, 7 (13); 80-ton class, 34 (54); 90-ton class, 219 (233); 100-ton class, 2 (1); 110-ton class, none, (1); 120-ton class, 4 (9); 130-ton class, 9 (25); 140-ton class, 27 (41); 150-ton class, 34 (56); 160-ton class, 12 (17); 170-ton class, 38 (39). (Fisheries Economic News, February 26, 1963.)

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EXPORTS OF PRINCIPAL CANNED FISHERY PRODUCTS, 1961-62:

According to figures released by the Japanese Ministry of Finance, canned fishery products exports valued at US$157 million were cleared (through Customs) in calendar year 1962. This represents an increase in value of

Japanese Exports of Canned Fishery Products, 1961-1962

Product	Quantity		Value	
	1962	1961	1962	1961
	1,000 Cases		US$1,000	
Salmon	2,616	1,260	91,231	37,094
Tuna in oil	1,410	1,434	10,725	10,192
Tuna in brine	2,191	2,205	19,646	19,172
Mackerel	1,043	938	3,736	3,501
Saury	938	405	5,628	2,187
Sardine	140	313	1,170	2,451
Jack mackerel	412	628	2,919	4,284
Crab	449	496	10,807	11,856
Shrimp	177	32	2,377	474
Oyster	414	431	3,058	2,928
Others	779	500	5,804	4,887
Total	10,569	8,642	157,101	99,026

Japan (Contd.):

$58 million or 58.6 percent over the 1961 exports valued at $99 million. Canned salmon exports in 1962 as compared with 1961 increased by $54 million or 107.6 percent and canned shrimp exports rose by $1.9 million or 401.5 percent. (Suisan Tsushin, March 2, 1963.)

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EXPORTS OF CANNED FISHERY PRODUCTS, FISCAL YEARS 1961 AND 1960:

Japan's total exports of canned fishery products in fiscal year 1961 (April 1961-March 1962) were up 4.4 percent from those in the previous fiscal year, due mainly to an increase in exports of canned tuna and horse-mackerel. There was a decline in exports of canned sardines, mackerel-pike, and crab meat. (Suisan Tsushin, February 8, 1963.)

Japanese fish-meal factoryship Renshin Maru operating in Bering Sea.

Japanese Canned Fishery Products Exports, Fiscal Year 1961 and 1960

Product	FY 1961 1/ U. S.	Canada	Other	Total	FY 1960 2/ Total
	(Actual Cases)				
Crab meat	210,187	5,702	263,977	479,866	516,812
Tuna:					
In oil	-	190,138	1,312,121	1,502,259	1,322,684
" brine	2,293,958	-	-	2,293,958	2,150,548
Other types	733	6,913	260,831	268,477	118,899
Total tuna	2,294,691	197,051	1,572,952	4,064,694	3,592,131
Mackerel-pike	18,065	340	503,548	521,953	829,387
Sardine	12,669	30	273,650	286,349	569,760
Horse-mackerel	-	-	696,113	696,113	522,507
Salmon, trout	150,419	206	1,542,330	1,692,955	1,646,384
Other fish	27,307	11,253	584,685	623,245	333,131
Shellfish	307,955	133,984	73,763	515,702	509,896
Other aquatic products	10,487	250	11,268	22,005	7,396
Grand Total	3,031,780	348,816	5,522,286	8,902,882	8,527,404

1/April 1961-March 1962. 2/April 1960-March 1961.

FISH MEAL OFFERED FOR SALE:

A Japanese fishing company in March 1963, offered for sale about 3,000 metric tons of fish meal produced by its fish-meal factoryship Renshin Maru (14,094 gross tons) which operated off Angola in the Atlantic Ocean. The company asked 60,000 yen per metric ton (US$151 per short ton) for its product. Consumer organizations in Japan countered with a maximum offer of 57,000 yen per metric ton (US$144 per short ton). A recent price paid for Peruvian fish meal imported into Japan was reported to be 55,000 yen per metric ton (US$138 per short ton).

According to a later report (Suisan Tsushin, March 26, 1963), the Renshin Maru returned to Tokyo on March 23, with 3,500 metric tons of fish meal. The operators, of the factoryship, according to the report have agreed in principle to sell the 3,500 tons of fish meal for 59,000 yen per metric ton (US$149 a short ton), warehouse delivery.

Japan (Contd.):

Since February 1963, two shipments of Peruvian fish meal totaling 14,820 metric tons were imported into Japan. The second shipment of 7,750 metric tons arrived during the week of March 4. A third shipment of 7,500 metric tons was expected to arrive in Japan during early April. It is reported that the Japanese Government has approved the importation of an additional 15,000 metric tons of fish meal. (Suisan Tsushin, March 11 & 12, 1963.)

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TARGETS FOR FISH-MEAL FACTORYSHIPS IN EASTERN BERING SEA, 1963:

The combined production target of the two Japanese fish-meal factoryships which are scheduled to operate in the eastern Bering Sea in the spring and summer of 1963 is reported to be 17,800 metric tons. The factoryship Gyokuei Maru's (12,100 gross tons) target is reported to be 10,800 metric tons, and that of the Soyo Maru (11,192 gross tons) 7,000 metric tons. (Suisan Tsushin, March 30, 1963.)

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DELAY IN BERING SEA HALIBUT FISHERY ANTICIPATED:

Part of the Japanese fishing industry is concerned with the date of Canada's ratification to the recommendation of the International North Pacific Fisheries Commission which removed the halibut of the eastern Bering Sea from abstention by Japan. The Japanese were expecting the ratification by Canada to be made on March 25 but due to the political situation of Canada, which was faced with a general election on April 8, the date of ratification was expected to be delayed. This delay, according to the Japanese, may cause the loss of this year's halibut fishing season. (Japanese newspaper, March 5, 1963.)

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BERING SEA RESEARCH TO INCLUDE HALIBUT AND OTHER BOTTOMFISH:

In line with the joint conservation measures on halibut recommended by the interim meeting of the North Pacific Fisheries Commission, it was agreed to put into practice the research plans to expand the scientific basis for the preservation of all bottomfish in the Bering Sea. The Japanese Fisheries Agency's Investigation and Research Division is studying ways and means to implement the agreement. The agreement on halibut research was for the year beginning March 25, 1963, during which investigations will be made and regulations will be recommended for use after 1964. The Fisheries Agency believes that the results of research for just one year would not be adequate and that it would be necessary to continue the investigations for several years.

The Agency has decided to carry out an investigation of other bottomfish resources in addition to the studies on halibut. Plans call for: (a) to investigate the entire area of the Bering Sea including the Gulf of Alaska; and (b) in addition to dispatching a research ship, investigators will board the motherships of the northern sea fishing fleets and instead of reports on catches by the fleets as in the past, each catcher will be directed to submit its detailed catch log. Tagging will be carried out at the same time. The sphere of the investigations call for (1) distribution of halibut, (2) conditions of halibut resources, and (3) investigation of all bottomfish other than halibut. (Suisan Tsushin, February 26, 1963.)

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LICENSES ISSUED FOR BERING SEA BOTTOMFISH FISHERY FLEET:

The Japanese Fisheries Agency late in March 1963, issued licenses for 19 motherships and 262 catcher vessels to participate in the 1963 Bering Sea bottomfish fishery. The catcher vessels licensed by type of gear are as follows: 101 trawl; 105 long-line; 36 combination trawl, long-line, and set net; 18 combination trawl and gill net; and 2 gill-net vessels. Of the 105 catcher vessels licensed to fish long-line only, 80 vessels are authorized to fish for halibut in the new quota area. (United States Embassy, Tokyo, March 26, 1963.)

Note: A newspaper report (Suisan Keizai Shimbun, February 27, 1963) gave a total of 19 motherships and 252 catcher vessels.

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BASES IN GHANA MAY BE AFFECTED BY COMPETITION WITH SOVIET TRAWLERS:

Since, 1961, many Japanese fishing vessels have been based in Ghanaian ports and during this period, an increased number of Soviet vessels (mostly trawlers) have ap-

Japan (Contd.):

peared on the scene. The result has been an oversupply of fish at times, which caused prices to drop. Japanese diplomatic officials in Ghana have reported the situation to their Foreign Office in Tokyo and predict that if the Soviets adopted a policy of leasing or chartering their vessels to Ghanaian interests, that the Japanese trawlers would be forced to leave Ghana. (Japanese newspaper, February 23, 1963.)

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CANADIANS PROPOSE TO EXPORT HERRING ROE TO JAPAN:

According to a Japanese press report dated February 22, 1963, the Canadians are anxious to export herring roe to Japan. Some of the herring roe products experimentally manufactured have already arrived at Yokohama and said to be waiting for the issuance of foreign exchange allocation.

The Japanese Fisheries Agency states that because of restrictions on foreign exchange in 1962 the product was not imported, but this year there is a possibility of importing herring roe due to the improved foreign fund situation. It is likely that the Japanese Government will allocate foreign funds for the product included with other consumption items before the end of the fiscal year.

Imports of herring roe from Norway and Canada under the global quota may develop this year, but the quantities will be about 20-30 metric tons. (Suisan Tsushin, February 22, 1963.)

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ELECTRONIC TELEMETERING WEATHER DATA SYSTEMS:

An integrated computer and telemetering weather data system was delivered to the Japan Meteorological Agency by a manufacturing company in Tokyo, according to reports. The system was operating in the Tokyo Bay area in early 1963. It has been reported that the Tokyo firm will also produce the first Japanese telemetering oceanographic buoy in accordance with international agreements on ocean buoy telemetering frequency allocation. (Newsletter, January 31, 1963, United States National Oceanographic Data Center.)

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FISHERIES LABORATORY SYSTEM TO BE REORGANIZED:

The Japanese Fisheries Agency is planning to reorganize the regional laboratory system in fiscal year 1964 (April 1964-March 1965) in order to improve fishery research. Fishery research in Japan is conducted presently by 8 regional laboratories. Under the proposed reorganization, the existing 8 laboratories will be consolidated into 4 laboratories, and 4 special laboratories will be established to conduct research on fisheries such as salmon, king crab, bottomfish, and tuna, which are considered to be of international importance.

The Fisheries Agency hopes, by this reorganization, to improve and expand fishery research so that the Government's fishery policy will reflect more closely results of biological investigations. It was reported that in the past, the lack of well-defined research programs caused a division between research and administration which resulted in inconsistent fishery policies. For example, in 1961, the Government reportedly acted independently and without definite knowledge of fishery resources in the Bering Sea and authorized as many as 33 bottomfish fleets to operate in that area. That action resulted in the fishing ground becoming overcrowed and many fleets suffered financial losses. (Suisan Keizai Shimbun, February 5 and 28, 1963.)

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JOINT JAPANESE-PORTUGUESE SEAWEED PROCESSING COMPANY PLANNED:

The plan to establish a joint Japanese-Portuguese seaweed processing company with a capital of US$400,000 has been approved by the Japanese Overseas Investment Liaison Committee. The plan is expected to be initiated without delay. The objective of the joint enterprise is to buy and process seaweeds for export as basic materials for agar agar. In the beginning, the joint company plans to produce about 1,500 metric tons. The ratio of investment will be equal between Japan and Portugal. (Suisan Tsushin, February 4, 1963.)

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OVERSEAS TRAWLERS ASSOCIATION FORMED:

Six Japanese fishing firms have organized a group called the Overseas Trawlers Association. Officers of two of the firms were elected as president and vice president of the Association.

Japan (Contd.):

The Overseas Trawlers Association has a five-point objective: (1) promotion and maintenance of goodwill in foreign countries; (2) rational utilization of overseas bases; (3) investigation and development of resources; (4) promotion, expansion, and stabilization of foreign markets; and (5) stabilization of management relations.

The 6 firms comprising the Association membership own a total of 30 trawlers, 28 of which are in actual operation, almost all of which operate in the Atlantic Ocean. Besides the 28 vessels, one of the member firms is reported to be constructing two 2,500-ton trawlers which are expected to be completed in 1963. Another firm is reported constructing four stern trawlers of over 2,600 tons each, and a 3,000-ton trawler is to be built by another firm. In addition, it was reported that plans call for converting the tuna mothership Tenyo Maru No. 3 (3,800 gross tons) into a stern trawler when she returns from the South Pacific tuna fishing grounds. All those vessels are expected to be sent to the Atlantic Ocean when completed.

Distant-Water Trawler Fleet of Overseas Trawlers Association

Vessel	Gross Tons	Area of Operation	Year Constructed
Asama Maru	993	Atlantic Ocean	1954
Ikoma Maru	995	" "	1954
Amagi Maru	2,249	" "	1960
Ibuki Maru	2,503	" "	1961
Unzen Maru	2,525	" "	1962
Hidehiko Maru	2,525	" "	1962
Oe Maru	2,525	" "	1962
Kaibun Maru	2,518	" "	1962
Taiyo Maru:			
No. 56	774	Atlantic Ocean	1954
" 57	774	South Pacific	1954
" 61	1,497	Atlantic Ocean	1957
" 62	1,482	" "	1960
" 63	1,482	" "	1960
" 65	1,829	" "	1960
" 66	1,829	" "	1960
" 67	1,484	" "	1961
" 68	1,498	" "	1961
" 71	1,475	" "	1962
" 72	1,498	" "	1962
" 73	1,495	" "	1962
Akebono Maru:			
No. 50	1,409	Atlantic Ocean	1961
" 51	1,459	Bering Sea	1961
" 52	1,471	" "	1962
" 53 1/	1,451	Atlantic Ocean	1962
Daishin Maru:			
No. 10	1,493	Atlantic Ocean	1962
" 11	1,494	" "	1962
Nichinan Maru	2,518	Atlantic Ocean	1962
Aoi Maru No. 2	1,474	Atlantic Ocean	1962

1/ Originally licensed to operate in Bering Sea but diverted to Atlantic Ocean in September 1962.

Of those trawlers operating in the Atlantic Ocean, all except one are fishing off West Africa. The exception is the Aoi Maru No. 2 (1,474 gross tons) which has been fishing for cod out of St. Pierre, off the coast of Newfoundland. The Association members are watching the performance of the Aoi Maru with great interest, and several members are reported already to have submitted applications to the Fisheries Agency to engage in the northwest Atlantic fishery.

The Japanese Atlantic trawl fleet operates principally out of Las Palmas, Canary Islands, as do many of the Japanese tuna vessels fishing in the tropical Atlantic. Because of the large number of Japanese fishing vessels calling at Las Palmas, the Association plans to request the Japanese Government to establish a Consulate in that port. (Suisan Shuho, February 5; Shin Suisan Shimbun Sokuho, February 7, 1963, and other sources.)

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VESSEL LEAVES FOR ECUADORAN BASE:

As a result of negotiations between Japanese and Ecuadoran fishing interests that began in 1962, the Japanese vessel Daijin Maru No. 7 of Choshi Chiba Prefecture was due to sail for Ecuador late in February 1963. The vessel will fish (hook and line) for skipjack tuna and trawl for shrimp for the next 3 years. Catches will be sent to a freezing plant at Quito, Ecuador, and the frozen shrimp will be exported to the United States.

The Daijin Maru No. 7 has shifted her operations from the North Pacific salmon fishery in which it participated as a catcher vessel belonging to the Koyo Maru fleet. (Fisheries Economic News, January 26, 1963.)

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VESSELS AND CREWS SEIZED BY FOREIGN COUNTRIES IN 1962:

The Japanese Maritime Safety Agency has reported on Japanese fishing vessels seized by foreign countries in 1962. Seizures amounted to 104 vessels with 1,016 crewmen. While the number of captured vessels decreased, that of crew members increased by 10 percent over the previous year. Vessel seizures by Spanish Africa, Ecuador, and Alaska were the first in recent years.

The Agency, in warning pelagic fishing vessels of an increasing number of countries now insisting on wider territorial waters, pointed out the importance of: (1) care should be taken to prevent suspected intrusion of territorial waters not recognized by Japan, and (2) complete procedures for an emergency call at a foreign port necessitated by rough weather or unexpected sickness. The status of vessel seizures in 1962 is as follows:

Soviet Union: 72 vessels, 506 personnel (89 vessels, 579 personnel, the previous year), representing 70 percent of the total number of vessels. Around Habomai, Shikotan Islands, off the eastern tip of Hokkaido, 58 vessels were seized, followed by 8 off the southern coast of Saghalin. Last year 26 vessels and 422 crew members were released but 134 members were still held as of the end of 1962.

South Korea: 15 vessels 116 crew members. The seizure of large-sized vessels such as trawlers decreased in 1962 while that of small-sized (less than 20 ton vessels) such as hook and line vessels increased. This is attributed to the fact that wireless equipment on large-sized vessels is improving and warning from the Agency's patrol boats is becoming efficient enough to reach all of those vessels. A total of 57 vessels succeeded in eluding Korean pursuers or twice as many as in the previous year. As of the end of 1962, 27 crew members were still held.

There were no seizure cases by Taiwan and Red China during 1962. Two vessels with 24 men were seized by North Korea; 7 vessels, 99 men, by the United States (off Alaska and around the Bonin Islands); 3 vessels, 87 men, by Ecuador; 3 vessels, 83 men, by Indonesia; 1 vessel, 47 men by the Philippines; and 1 vessel, 54 men, by Spanish Africa. With the exception of being fined, immediate release took place of the vessels and crew members by the 3 captured by the United States and 2 by Ecuador. As of the early part of 1963, two vessels with 24 men were reported seized by the Soviet Union, and 2 vessels with 19 men, by South Korea. (Japanese newspaper, February 25, 1963.)

Jordan

FISH LANDINGS INCREASE IN 1962:

Fishery landings during 1962 in Jordan are officially estimated at 185.8 metric tons, a sharp rise from the 138.2 tons landed in 1961. Although the landings still supply only about $\frac{1}{5}$ of the domestic consumption, there is hope that recent economic agreements with Saudi Arabia will result in Jordan obtaining fishing rights in rich Saudi waters, and that modest foreign exchange savings will result. (United States Embassy, Amman, March 15, 1963.)

Malagasy Republic

TERRITORIAL WATERS EXTENDED TO 12 MILES:

The Malagasy Government's decision fixing the territorial waters of Madagascar at 12 miles has been made effective by Presidential Decree No. 63-131 signed February 27, 1963, and published in the Journal Official de la Republique Malgache, March 9, 1963.

Two supplementary governmental orders regulate the use of explosives for underwater research and the conditions of passage and anchorage for foreign fishing vessels in Malagasy territorial waters.

A recent unauthorized visit by 15 Soviet fishing vessels to a remote point on the Malagasy Coast brought home to the Republic's Government the need to establish the new coastal limits. (United States Embassy, Tananarive, March 2 and April 6, 1963.)

Malaya

FISHING VESSELS BARRED FROM INDONESIAN TERRITORIAL WATERS:

The Indonesian Navy announced on February 20, 1963, that "any Malayan fishing boat caught in Indonesian waters will be burned on the spot." The announcement was received with consternation by Malayan west coast fishermen, but press interviews with the fishermen indicate that they will obey the edict. According to a spokesman for fishermen in the Selangor area, the abandoning of the "traditional" fishing grounds off Sumatra will mean a significant drop in income because the fish are larger and more plentiful off the Sumatran coast, but this is preferable to the loss of nets and vessels.

The Royal Malayan Navy has ordered Malayan fishing boats to stay out of Indonesian waters and ships are patrolling at strategic points to offer the Malayan vessels protection. However, there are 2,000 to 3,000 fishing vessels which the Royal Malayan Navy has announced cannot be given "individual protection" and they can be given "none at all if they enter Indonesian territorial waters." (United States Embassy, Kuala Lumpur, March 5, 1963.)

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JOINT MALAYAN-JAPANESE TUNA-PROCESSING FIRM EXPANDS:

A spokesman for a jointly owned Malayan-Japanese tuna-processing firm reported that the company is planning a big increase in its shipments of frozen tuna to the United States and Japan this year.

A consignment to the United States in January amounted to 500 tons of frozen tuna and in February another 500 tons were exported. Shipments to Japan amounted to 700 tons in January and 700 tons in February.

The company's new canning plant on River Road, Penang, is nearing completion and when production starts, the output is expected to increase threefold. Canning at present is being carried out at another factory on Patani Road with output at 150 cases a day.

Production of tuna sausages for the Malayan market has been stopped since April 1962, because the demand is light as the Malayans are not accustomed to eating tuna. (Japanese newspaper, February 13, 1963.)

Mexico

SOVIET TRAWLERS FROM CUBAN BASES REPROVISION AT VERACRUZ:

Two more Soviet trawlers arrived in Veracruz, Mexico, in January 1963 to reprovision--the Olenij on January 15, and the Ochotsk on January 12. They took aboard a normal supply of food, estimated to

Mexico (Contd.):

be sufficient for about 15 days, for about 25 men on each vessel.

The frequent arrivals of Soviet trawlers provoked some comment in a Veracruz newspaper on January 18. It was noted that the vessels are using Veracruz for what amounts to a resupply base, causing speculation as to conditions in Cuba that force the trawlers to use a Mexican port for resupply. The newspaper questioned why that port is used exclusively since the ports of Progreso and Coatzacoalcos are equally adapted to filling the needs of the vessels and may be closer to their areas of operations. The newspaper made the observation that the Russians, while fluent in Spanish, are reluctant to talk about their fishing activities. (United States Consul, Veracruz, January 27, 1963.)

Morocco

CANNED FISH EXPORTS AT RECORD LEVEL AS OF DECEMBER 1962:

Exports of canned fish by Morocco, after a slow start in the 1962/63 marketing season, were higher at the end of December than the previous record 1961/62 season (1,878,520 cases as compared with 1,699,111 cases). December exports of 381,098 cases set a new all-time high for any one month. Sardine (the leading canned fish product) exports in December increased 9.2 percent. Canned tuna exports rose 47 percent (220,938 cases as compared with 150,449 cases).

Sardine exports to Cuba through early October 1962 amounted to 187,329 cases as compared with 30,000 cases in 1961. These exports reflected Morocco's attempt to balance bilaterally its heavy sugar imports. Another large shipment of 90,000 cases to the U.S.S.R. was reported in December. Exports to France as of October 31, remained the same (about 500,000 cases), while shipments to Ghana dropped sharply to 100,024 cases from 218,713 cases.

Moroccan exports of frozen sardines to France caused rioting in fishing centers in Brittany in the summer of 1962. In the trade agreements made with France in December 1962, the French free entry quota was reduced from 8,500 metric tons to 7,500 tons of frozen sardines, with the further provision that Moroccan exports would be suspended during the length of the French summer sardine fishing season. The 1,000-ton reduction in frozen sardine exports may be used for the export of other fish to France. (United States Embassy, Rabat, February 21, 1963.)

Netherlands

RESULTS OF 1961/1962 ANTARCTIC WHALING SEASON UNFAVORABLE:

During the 1961/1962 Antarctic whaling season the catch of the Netherlands' whaling expedition, headed by the factoryship Willem Barendsz, amounted to 614.8 blue whale units, down sharply from the previous season. The catch was announced by the Netherlands Whaling Company in its annual report for the fiscal year July 1961-June 1962. The company reported a deficit of about fl.4.9 million (US$1,360,000) at the end of the 1961/1962 fiscal year. During that fiscal year, income totaled fl. 12.3 million (US$3,420,000) as compared with fl. 21.7 million (US$6,030,000) in the previous fiscal year. The management attributed the drop in income to (1) lower whale oil production and (2) a sharp drop in whale oil prices as a result of competitive pressure from Peruvian fish oil.

Production of the Netherlands Whaling Company's Factoryship Willem Barendsz, 1960/1961 and 1961/1962

Product	1961/1962 Season1/			1960/1961 Season2/		
	Quantity	Average Sales Price		Quantity	Average Sales Price	
	Metric Tons	Fl./ Metric Ton	US$ Metric Ton	Metric Tons	Fl./ Metric Ton	US$ Metric Ton
Whale oil	12,084	467	130	21,667	739	205
Sperm oil	2,915	769	214	1,702	696	193
Whale meal	1,742	550	153	4,156	398	111
Whale meat3/	1,220	808	224	2,137	748	208
Whale liver	417	909	253	519	898	249

1/Antarctic season opened December 12, 1961 and closed April 15, 1962.
2/Antarctic season opened November 28, 1960 and closed April 6, 1961.
3/Two Japanese freezerships working with the Willem Barendsz froze an additional 8,175 tons of whale meat which was shipped to England.

The Willem Bardensz, accompanied by 11 catcher vessels, renewed Antarctic operations on December 12, 1962. Only one Japanese freezership, the 7,000-ton Awazu Maru, is working with the Netherlands' expedition this season. The production of the Willem Barendsz as of February 17, 1963, was reported as follows (figures in parentheses give production during the comparable period in the 1961/1962 season): whale oil, 7,841 metric tons (7,632 tons); sperm oil 2,254 tons (1,749

Netherlands (Contd.):

tons); fish meal, 840 tons (1,087 tons); and frozen whale meat, 355 tons (941 tons). The expected production of whale meat and sperm oil during the 1962/1963 season is reported to have been sold in advance. (United States Consulate, Amsterdam, February 25, 1963.)

Notes: (1) Netherlands guilders 3.6 equals US$1.00.
(2) See Commercial Fisheries Review, July 1962 p. 87, April 1961 p. 73.

Northern Rhodesia

BRITISH MAY AID LAKE KARIBA FISHERIES DEVELOPMENT:

It is likely that Northern Rhodesia will get assistance from the Freedom from Hunger Campaign amounting to about Ł260,200 (US$728,000) for five projects.

Included in that sum is an application for financial assistance for the training of fishermen and the development of Lake Kariba fisheries at a cost of Ł40,000 (US$112,000) which has been adopted by the Freedom from Hunger Campaign Committee in the British City of Nottingham. It includes a fisheries' training project and the provision of a fund from which loans can be made to fishermen for the purchase of gear. (United States Consulate General, Salisbury, April 1, 1963.)

Norway

EXPORTS OF CANNED FISH, JANUARY-OCTOBER 1962:

During January-October 1962, Norway's total exports of canned fish showed an increase of 12.5 percent in quantity and 15.8 percent in value over exports in the same period of 1961, due mainly to an increase in exports to the United States and the United Kingdom.

Norway's Total Exports of Canned Fish, January-October 1961-62[1]

Year	Quantity	Value	
	Metric Tons	Million N. Kr.	Million US$
1962	25,868	130.8	18.3
1961	23,000	113.0	15.8

1/Preliminary.

The United States was the leading buyer of Norwegian canned fish during January-October 1962, taking 43.2 percent of total exports, or 11,186 metric tons valued at N. kroner 58.0 million (US$8.1 million) as compared with 8,949 tons valued at N. kroner 47.8 million (US$6.7 million) during the same period of 1961. Other important markets for Norwegian canned fish in 1962 were the United Kingdom, Australia, Canada, East Germany, and South Africa.

The 1962 brisling pack amounted to 417,918 standard cases (100 3-3/4-oz. cans), as compared with 431,366 standard cases in 1961.

The 1962 pack of kippered herring from the winter sild catch totaled 429,105 standard cases (100 3-1/4-oz. cans), as compared with 188,000 standard cases in 1961. An annual pack of about 400,000 cases of kippered herring is considered normal in Norway.

In 1962, the pack of canned shrimp declined, but the pack of canned crab was about equal to that in 1961. Canned anchovy production increased in 1962, while the pack of other sild delicatessen specialties was about the same as in 1961.

Production costs in Norwegian canneries are increasing and competition for foreign markets is becoming tighter, according to the Norwegian Canners National Association. Adjustments in the external tariffs of European Common Market countries have had an unfavorable effect on Norwegian canned fish exports to those countries. On the other hand, reductions in internal tariffs between European Free Trade Association countries have been helpful to some Norwegian exporters. The Norwegian canning industry is said to favor full membership in the European Common Market for Norway. (Norwegian Canners Export Journal, January 1963.

Note: Norwegian kroner 7.15 equals US$1.00.

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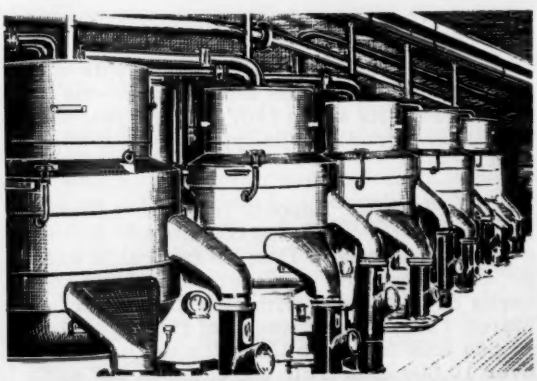
FISHERIES LANDINGS, 1960-1962:

Norwegian fisheries landings in 1962 were down 15.4 percent in quantity and 5.0 percent in value from those in 1961, according to preliminary data. The decline was due mainly to the almost complete failure of the capelin (smelt) fishery and lower cod landings. The 1962 spring cod fishery off the coast of north Norway attracted only a little more than half as many fishermen as in 1961. But good catches of cod off Greenland, Iceland, and Bear Island helped bolster the fishery in 1962.



One type of centrifuges used for producing fish oils.

Norway (Contd.):

Norwegian Fishery Landings, 1960-1962

Species	1962			1961			1/1960		
	Quantity	Value		Quantity	Value		Quantity	Value	
	Metric Tons	Kr. 1,000	US$1,000	Metric Tons	Kr. 1,000	US$1,000	Metric Tons	Kr. 1,000	US$1,000
Fish:									
Winter herring	84,068	33,150	4,636	69,042	24,732	3,459	300,143	89,684	12,543
Other herring & sprat	488,059	140,483	19,648	483,740	142,728	19,962	398,231	108,156	15,127
Total herring	572,127	173,633	24,284	552,782	167,460	23,421	698,374	197,840	27,670
Capelin (smelt)	363	59	8	217,168	28,782	4,025	92,765	10,399	1,454
Cod	200,051	182,160	25,477	234,531	217,672	30,444	213,439	186,611	26,099
Haddock	44,285	37,383	5,228	46,791	37,037	5,180	38,359	29,076	4,067
Halibut2/	4,775	16,861	2,358	4,056	14,933	2,089	5,663	18,867	2,639
Saithe	79,176	43,549	6,091	66,340	37,097	5,188	77,864	43,657	6,106
Mackerel	16,885	13,435	1,879	15,003	11,493	1,607	19,737	12,354	1,728
Tuna	6,814	13,002	1,818	6,639	11,162	1,561	3,280	5,802	811
Other species	133,767	100,010	13,987	112,932	91,643	12,817	135,739	99,727	13,948
Total fish	1,058,243	580,092	81,130	1,256,242	617,279	86,332	1,285,220	604,333	84,522
Fish livers and roe	20,545	10,244	1,433	32,560	15,937	2,229	29,950	15,360	2,148
Shellfish:									
Shrimp	10,504	40,696	5,692	10,036	31,899	4,461	9,616	29,977	4,193
Lobster	500	7,686	1,075	681	9,249	1,294	787	10,038	1,404
Crab	3,633	2,273	318	4,062	2,531	354	3,958	2,291	320
Squid	6,018	1,981	277	-	-	-	278	33	5
Total shellfish	20,655	52,636	7,362	14,779	43,679	6,109	14,639	42,339	5,922
Seaweed, dried	14,000	2,500	350	13,000	2,550	357	13,004	2,554	357
Total landings	1,113,433	645,472	90,275	1,316,581	679,445	95,027	1,342,813	664,586	92,949

1/Preliminary
2/Does not include the lower valued "Greenland halibut."
Note: Norwegian kroner 7.15 equals US$1.00.

The total herring catch in 1962 was 3.4 percent above that in 1961. There was a substantial increase in landings of herring for reduction into meal and oil, due mainly to a better Norwegian catch of summer herring in Icelandic waters. The 1962 winter herring catch was only slightly better than that for 1961.

The Norwegian shrimp catch was at a record level in 1962. (Norwegian Fishing and Maritime News.)

Note: See Commercial Fisheries Review, August 1962 p. 84.

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FISHERIES TRENDS, MARCH 1963:

Winter Herring: The winter herring fishery off west Norway in 1963 ended with a total catch of only 57,000 metric tons--the poorest results since 1902. A few years ago, the fishery produced daily landings of 60,000 tons.

Cod Fishery: Reports from north Norway indicate that the Lofoten cod fishery will be a failure this year. Despite favorable weather, cod fishermen were returning from the banks day after day with very little fish. In March 1963, after 7 weeks of fishing, only 13,604 tons had been landed, a decline of over 10,000 tons from the catch in the same period of 1962. There was no prospect of any substantial improvement in the fishery.

Whaling: By March 9, 1963, Norway's Antarctic whaling expedition had produced 180,000 barrels of whale and sperm oil, down 27.2 percent from the 247,315 barrels produced during the comparable period of the 1961/1962 season. Norway had 4 factoryships operating in the Antarctic at the start of the current season, but 1 of those vessels was damaged by a storm and has not been in operation since January 28, 1963. (News of Norway, March 21 and 28, 1963.)

Note: See Commercial Fisheries Review, April 1963 pp. 66-67.

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FISHERMEN'S 1961 AVERAGE EARNINGS:

A statistical study of Norwegian fishermen's earnings in 1961, covering 6 percent of all professional fishermen in Norway, showed an average annual income of Kr. 8,192 (US$1,146). In 1961, over 30 percent of Norway's fishermen earned more than Kr. 10,000 ($1,399), about 32 percent earned between Kr. 6,000-10,000 ($839-1,399), and 37 percent earned less. (News of Norway, February 28, 1963.)

Notes: (1) Norwegian kroner 7.15 equals US$1.00.
(2) See Commercial Fisheries Review, Aug. 1962 p. 84.

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FUTURE TRENDS IN FISHERIES INDICATE NEED FOR MODERN DEEP-SEA FLEET:

In 1962, Norwegian fishermen landed 1,113,443 metric tons of fish valued at 645.5

Norway (Contd.):

million kroner (US$90.3 million). The landings decreased by 203,138 tons, and the value by 34 million kroner ($4.8 million) from 1961. The chief reason for the drop in the 1962 landings was the failure of the capelin fishery. The shrimp fishery had record landings and the Norwegian freezing plants' organization increased their exports of frozen fishery products to about 40,000 tons. This organization exported frozen fishery products to 30 foreign markets including the United States which took more than 11,000 tons.

In spite of the lower landings, the Norwegian authorities are by no means pessimistic about the future of the Norwegian fisheries. It is recognized that rationalization is necessary for economical operation of the fleet. The Norwegian Minister of Fishery, states that the main problem has for the past few years been to compensate for the decrease in seasonal and coastal fisheries. While large fishing vessels have been able to change over to deep-sea fishing, small and medium fishing vessels are unable to do so.

He pointed out the necessity of constructing a modern fishing fleet to engage in coastal and seasonal fisheries when conditions are favorable, and fishing in distant waters when this appears to be advantagous. In May 1962, the Fishery Department appointed a committee with the task of working out a program for the reorganization of the deep-sea fishing fleet. The committee's recommendation will be decided upon by the authorities in the near future. In the course of the first three years, old and unserviceable fishing vessels will be replaced by modern vessels. For the past 2 to 3 years the Norwegian Government has supported the construction of a number of new stern trawlers from 400 to 1,000 tons. After those "trial fishing vessels" have been in operation for some time and their effectiveness and profitability have been thoroughly studied, greater investments will be made in a development program for the trawler and deep-sea fishing fleet. The development program will in turn lead to important structural changes in the Norwegian fisheries. (Norwegian Fishing and Maritime News, No. 4, 1962.)

* * * * *

CANNING SCHOOL AND LABORATORY SUPPORTED BY CANNING INDUSTRY:

The Norwegian Canning School is attracting considerable attention. Designed and equipped to provide a well rounded education in all aspects of canning, it is located in Stavanger near the research laboratory of the Norwegian canning industry. Stavanger is also the home of Norway's largest packer of canned fish.

When the Norwegian Canning School opened in 1952, the emphasis was mainly on fish. It now covers the whole field of canning, including meat, fish, fruits, and vegetables. The school combines theoretical instruction with practical work in classrooms, chemical and bacteriological laboratories, and a small scale cannery equipped with the latest in automated machinery. Here, students pack anywhere from 120 to 150 different products. They also study physics, chemistry, bacteriology, hygiene, production planning, merchandising,, practical canning, engineering, and plant management.

Students, who must be at least 17 years of age, are not required to have worked in a cannery. Elementary school graduates attend a 2-year course, while those who have finished high school need only take a 1-year course. There is no tuition, and nearly all educational material is provided free of charge. Out-of-town students live in a dormitory where the fee for room and board is kept very low.

Since the school was started by the Norwegian Canners' Association slightly over 10 years ago, some 300 students have graduated. Presently, the school has 26 students from many parts of Norway. The school is financed by a small tax on all canned goods sold in Norway.

The research laboratory which the Norwegian canning industry maintains in Stavanger was established in 1931. Supervised by a board of industry and Government representatives, it is organized in three departments for chemical, bacteriological, and engineering research. The investigations conducted by the laboratory have had a wide range. The nutritional value of canned foods as well as production methods have been studied. Tests have been carried out to develop new products. A great deal of work has also been done to establish quality control and specifications for the canning industry's most important raw materials. Quality control is now carried out by an independent department of the laboratory. (News of Norway, March 14, 1963.)

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Norway (Contd.):

DRIED COD CONTRIBUTED TO WORLD FOOD PROGRAM:

In response to a request from the Food and Agriculture Organization (FAO), Norway planned to ship 50 tons of dried cod in early 1963, to Dar-es-Salam, Tanganyika, to help feed Ruandan refugees. The shipment was to be part of Norway's contribution to the World Food Program conducted under the sponsorship of the United Nations and FAO. (News of Norway, March 14, 1963.)

* * * * *

NEW SONIC FISHING AIDS MARKETED:

A fully transistorized low-cost echo sounder for smaller fishing vessels has been introduced by an electronics firm in Oslo, Norway. The device can detect fish down to some 850 fathoms, or by the flip of a switch, at much shallower depths. It is designed for installation at the front of the wheelhouse, so that the captain can watch the sounder for signs of fish while steering his vessel.

For larger fishing vessels, the Norwegian firm is offering a new fully automatic ASDIC (sonar) for trawlers and line-fishing vessels between 40 and 70 feet long. This instrument has a range of about 4,000 feet under normal conditions. Operating on a frequency of 50 kilocycles, it is immune to interference from other ASDICS or sounders.

The Oslo company maintains about 250 stations in foreign countries to provide service for its products. (News of Norway, March 21, 1963.)

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POWER BLOCK PROVES SUCCESSFUL IN HERRING SEINE FISHERY:

During the 1962 Icelandic herring fishery three Norwegian purse seiners were equipped with U. S. type power blocks. All three vessels made good catches, and a number of Norwegian fishing vessel owners have now ordered power blocks or are considering the changeover to this fishing method.

The chief fisherman aboard one of the three vessels stated:

"Norwegian fishermen might have saved millions of kroner if they had taken on power block and ring seine some years ago. After our experiences during the Icelandic fishery we do no longer doubt that this is the gear of the future for Norwegian fishermen."

Peru

ANCHOVY FISHERMEN'S TIE-UP UNSETTLED AS OF MARCH 1, 1963:

The important fishing industry was facing its greatest crisis since February 1962 due to the continuation of the tie-up of anchoveta fishermen and vessels which began on January 31, 1963.

Financial losses to the industry and the Government were mounting, and a general moratorium on the industry's financial obligations has been requested. The Lima Chamber of Commerce has asked financial institutions to be as lenient as possible in such matters.

There are two aspects of the situation--the fishermen's demands and the 25-sol (about 93 U. S. cents) per short-ton tax imposed on anchoveta landings used for reduction. Until the vessel operators know how the tax is to be applied, they cannot enter into a settlement with the fishermen. Meetings were being held constantly by all elements involved, including the Government. Although references to negotiated settlements of both phases of the problem have been noted, as of March 1, no definite solutions have been announced. (United States Embassy, Lima, March 1, 1963.)

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FISH-MEAL MAJOR INDUSTRY IN NORTHERN AREA:

The fish-meal industry is the principal topic of conversation in fisheries circles in northern Peru. Chimbote--the northernmost city where the industry is important--is booming. The population there now is about 120,000 (less than 10,000 in 1950), mostly living in straw-mat houses and employed or seeking employment in the fishing industry. Some 48 fish-meal plants reportedly are in operation or under construction in Chimbote alone. There are a few further north, 2 in Casma (3 under construction), and 9 in Chancay (with 10 planned immediately south of the present plants).

The two largest equipment suppliers are both Lima firms. The principal equipment supplied includes cookers, presses, dryers, and cyclones. Both of the firms will undertake to equip a 10- to 20-ton per hour plant costing from 500,000 soles (US$18,643) to 800,000 soles (US$29,828). Boilers, engines, and buildings are not included. All material, except engines, are produced in Peru. Plants of this kind (which represent

Peru (Contd.):

more than 50 percent of the fish-meal plants in Peru) are uneconomical to operate and wasteful (fish body oil is not removed), but they do make money at present prices. The larger and more modern plants are more elaborately equipped, with most of the equipment custom-built locally. Special equipment is required for oil processing and it is brought in principally from Norway and Denmark. The larger plants produce an estimated 70 percent of the fish meal, and can be expected to ride out depressed conditions which would ruin the smaller operators. Most plants canning fish (tuna or bonito) are closing because of depressed prices, high costs, and the more advantageous use of equipment in supplying anchoveta to fish-meal plants.

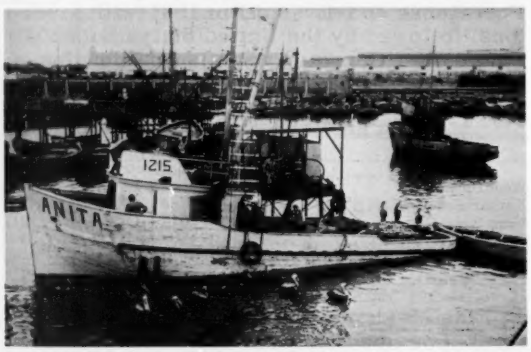

Fig. 1 - A typical small purse-seiner of the anchoveta fleet waiting to unload.

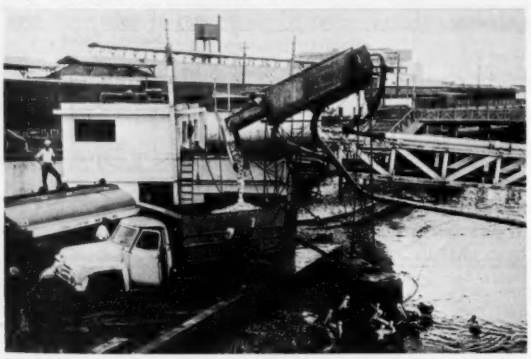

Fig. 2 - The fish are being pumped from the boat to a waiting truck.

Large numbers of fishing boats were seen in the various ports waiting to unload their anchoveta catches. Sufficient facilities still are not available to process all of the anchoveta being caught. Although few plants exist north of Chimbote, fishermen at Santa Rosa (near Trujillo) reported that considerable numbers of anchoveta exist there. One flock of sea birds flying up the coast of that area was observed that must have numbered 500,000. With this much bird life, large numbers of anchoveta must also be present. Little concern about conservation measures was expressed. (United States Embassy in Lima, March 13, 1963.)

Editor's Note: The above was reported by an officer of the United States Embassy following a trip to observe economic conditions in northern Peru. His trip preceded the late January tie-up of the anchovy fishing fleet.

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EXPORTS OF PRINCIPAL MARINE PRODUCTS, 1961-62:

Exports of fish meal by Peru in 1962 rose 49.1 percent in quantity and 101.6 percent in value as compared with the preceding year. The average export value in 1962 was about US$94.61 a metric ton ($85.83 a short ton), up sharply from the average of $69.96 a metric ton ($63.58 a short ton) realized in 1961 and reflected the stronger worldwide market for fish meal in 1962.

Exports of fish oil in 1962 of 127,969 tons increased 25.1 percent from the 102,306 tons exported in 1961. The average value of fish oil exports, however, increased only 6.8 percent in 1962 from the preceding year. Fish oil exports in 1962 averaged only 4.1 cents a pound, down about 14.6 percent from the 4.8 cents a pound average in 1961.

Peruvian Exports of Principal Marine Products, 1961-62

Item	1962			1961		
	Qty.	Value 1/		Qty.	Value 1/	
	Metric Tons	Million Soles	US$ 1,000	Metric Tons	Million Soles	US$ 1,000
Fish meal	1,055,883	2,678.3	99,899	708,366	1,328.6	49,556
Fish oil	127,969	310.7	11,589	102,306	290.8	10,847
Fish (froz., canned, etc.)	35,829	226.7	8,456	39,449	255.0	9,511
Fertilizer (guano)	15,351	39.9	1,488	15,861	41.6	1,552
Sperm oil	9,336	34.5	1,287	9,063	33.7	1,257
Whale meal	3,765	6.4	239	5,147	7.0	261

1/F.o.b. values converted at rate of 26.81 soles equal US$1.

In 1962, exports of sperm oil were about unchanged in both quantity and value, but the exports of fish (frozen, canned, etc.) dropped 9.2 percent in quantity, and the exports of whale meal were down 26.9 percent in quantity from the preceding year. (United States Embassy, Lima, March 21, 1963.)

Poland

FLEET OF LARGE WIDE-RANGING FREEZERSHIPS NEEDED TO RAISE FISH CATCH:

In its March 1 issue, a Polish periodical continued its promotion of a larger and more competitive Polish fishing fleet. The periodical poses the question: What is the likelihood of Poland's achieving its planned increase in catch during the next 17 years? Its answer: Not so good--in fact, impossible under present conditions.

Poland (Contd.):

The goals of the Polish fishing industry are impressive. From 169,000 metric tons of fish in 1961 and "several thousand less than that in 1962," fishermen are asked to bring in 325,000 tons in 1965, 500,000 in 1970, and 900,000 in 1980. To achieve anything even approaching those goals two things are necessary according to the article: (1) new fishing grounds, and (2) a modern fleet built to operate in such waters. In other words, a long distance fleet with modern equipment will be needed to gather Poland's share of the catch from the constantly receding Atlantic grounds. So far, the article states, not much is being done to build such a fleet.

According to the article, last autumn's cruise of the trawlers Odna and Gryf is given as an example of the "economic nonsense" which characterizes Poland's present effort. Those 2 vessels loaded up with 250 tons of fish in 5 days fishing off Capo Blanco, but took 25 days for the round trip to those waters. How much better it would be, the article pointed out, if trawlers could stay out for a whole month and then bring in up to 1,500 tons. Simple arithmetic shows the advantage of this system, but the article suggests that some interests are preventing the construction of the refrigerator ships, the fish storage and processing trawlers and other vessels. Present plans for the expansion of such a fishing fleet are insufficient to achieve the announced goals the article states, and ends by criticizing the Ministry of Shipping for hesitating to make additional investments in the fleet. (United States Consul, Poznan, March 11, 1963.)

Portugal

PRODUCTION AND EXPORTS OF MARINE OILS; EXPORTS OF FISH MEAL, 1959-1961:

Marine Oils: The annual total output of marine oils in Portugal between 1959 and 1961 showed little change. A noticeable increase in production of cod-liver oil in 1961 was offset by a decline in the production of other fish-liver oils and whale oil.

Export data in 1961 generally reflected production trends. Shipments of sardine oil and cod-liver oil were up substantially, but exports of other fish-liver oils and whale oil were down sharply. Total exports of Portuguese marine oils in 1961 were 13.5 percent below those in 1960.

Table 1 - Portuguese Production and Exports of Marine Oils, by Product, 1959-1961

Item	1961	1960	1959
	(Metric Tons)		
Production:			
Sardine oil	2,790	2,700	2,440
Cod-liver oil	3,800	3,150	2,430
Other fish-liver oils	1,557	2,000	3,000
Whale and sperm oil	2,360	2,630	2,600
Total Production	10,507	10,480	10,470
Exports:			
Sardine oil	3,470	2,631	2,820
Cod-liver oil	3,280	1,850	2,310
Other fish-liver oils	120	1,850	2,890
Whale and sperm oil	2,150	4,100	3,100
Total Exports	9,020	10,431	11,120

West Germany was the leading buyer of Portuguese cod-liver oil in 1961 with 1,940 tons, followed by the United States with 806 tons. West Germany was also the leading market for Portuguese sardine oil.

Table 2 - Portuguese Exports of Sardine Oil, by Country, 1959-1961

Country	1961	1960	1959
	(Metric Tons)		
West Germany	1,652	1,734	1,465
Netherlands	46	409	635
Norway	761	282	273
France	430	7	406
Other Countries	581	199	40
Total	3,470	2,631	2,819

Fish Meal: Portuguese exports of fish meal showed a sharp increase in both 1960 and 1961, due mainly to greater shipments to West Germany. (United States Embassy, Lisbon, March 6, 1963.)

Table 3 - Portuguese Exports of Fish Meal, by Country, 1959-1961

Country	1961	1960	1959
	(Metric Tons)		
West Germany	4,000	1,852	47
Greece	177	177	290
Netherlands	49	0	138
Spain	120	0	0
Portuguese Overseas Provinces	2	4	4
Other Countries	147	259	52
Total Exports	4,495	2,292	531

Note: See Commercial Fisheries Review, October 1960 p. 82.

Rhodesia and Nyasaland Federation

FISH PROCESSING RESEARCH AND FISH FARMING POTENTIAL, EARLY 1963:

The possibility of producing caviar from the roe of carp caught in landlocked Rhodesia

Rhodesia and Nyasaland Federation (Contd.):

is being investigated at the Fisheries Research Center of the Rhodesian Federal Ministry of Agriculture. A Government Fisheries Officer said he thought it would also be possible to make caviar from the roe of other fish species. He said that smoking and other methods of preserving fish were also being studied.

The Fisheries Officer said that there was plenty of opportunity and potential for fish farming in the Federation, which in 1962 imported fishery products with a total value of £1,250,000 (US$3,500,000). The value of the main categories of fishery products imported in 1962 were: fresh, chilled, or frozen fish--£400,600 ($1,121,680); preserved fish--£302,000 ($845,600); salted, dried, or smoked fish--£214,500 ($600,600); and shellfish--£23,500 ($65,800).

In addition to Lake Kariba (the world's largest man-made lake), Rhodesia has over 50,000 acres in lakes and ponds created by farm dams and other artificial means. An additional 100,000 acres are expected to be placed under water by projects planned for the near future. All of those waters can be used to some extent for fish culture.

The Fisheries Officer said that the production of one ton of fish per acre was a realistic possibility with intensive pond fish culture. He said, "Optimum management and improved conditions for fish rearing can result in the production of increasing amounts of fish for internal consumption. Although many of the waters that are exploited merely supply local consumption--because of the difficulties of preserving and transporting--they have a hidden value. Where the labor force are allowed to fish the dams, it provides a strong attraction to farm workers and makes a material contribution to their food supplies." (The South African Shipping News and Fishing Industry Review, January 1963.)

Senegal

TUNA LANDED BY FOREIGN VESSELS FOR FREEZING, 1962:

Tuna landed at Dakar by foreign fleets (other than French or Senegalese) is either transshipped or frozen and then shipped, both operations taking place outside the customs barrier. Complete statistics on such tuna are not available. The Statistical Service of the Port of Dakar reports that in 1962 only two countries, Japan and Spain, landed tuna for freezing in Senegal for reshipment. For Japan this amounted to 468.8 metric tons, and for Spain 162.7 tons.

Tuna entering Senegal, not covered by the Franco-Senegalese agreement, carries customs duties amounting to 33.3 percent ad valorem. Tuna entering the country under the agreement is not dutiable. (United States Embassy, Dakar, March 5, 1963.)

Singapore

FISH AND SHRIMP PONDS TO BE ESTABLISHED IN RECLAIMED SWAMPLAND:

The Singapore Government plans over a 4-year period to reclaim 4,000 acres of swampland at a cost of M$4.5 million and convert it into farmland, fish and shrimp ponds to provide employment for some 1,600 people. At present a pilot project of 176 acres is under way at Sugei Poyan. When the entire project is completed, it is planned that 1,000 acres will be used for cultivating leaf vegetables, 1,000 acres for shrimp ponds, and about 2,000 acres for fish ponds.

The Government plans to set up a cooperative to run the shrimp and fish ponds in the reclaimed area. Some 38 squatter families will be moved off the land and resettled elsewhere. The next step after the pilot project will be the reclamation of 760 acres in the neighboring areas, beginning with Sungei Berih. (United States Consul, Singapore, March 16, 1963.)

South Africa Republic

EXPANSION OF TRAWLER FLEET PLANNED BY LARGE FISHERY GROUP:

A large South African fishing industry group is planning a big increase in its fishing activities. Bids are being sought from British and Dutch shipyards for up to 20 new 100-foot trawlers which will join the group's fleet at Hout Bay, Capetown.

South Africa Republic (Contd.):

Two new ventures started in the Republic have combined in producing frozen fish from the group's Hout Bay plant. This production is being marketed locally throughout Cape Province. The present fleet of 5 vessels may shortly be augmented by the arrival of 3 second-hand trawlers under negotiation from a British trawling firm.

Beyond confirming that the 20 trawlers were planned, an official of the group in London would give no further details. But fishing authorities believe that part of the plan is to catch and process South African hake before freezing and exporting this variety to New Zealand.

As the fishing area is so near to the South African coast, it is not planned at this stage to use the trawlers in connection with a fleet fish-factory processing ship, as the length of their trips will not be more than 10 days. (World Fishing, March 1963.)

* * * * *

PILCHARD-MAASBANKER FISHERY, 1962:

The South Africa Republic west coast landings of pilchards in the January-July 1962 season totaled 452,735 short tons, according to the latest data available. The 1962 pilchard landings from South-West Africa's Walvis Bay amounted to 436,068 tons, or combined total pilchard landings of 888,803 tons--67,272 tons more than the record 1961 season landings.

During the main fishing season in January-July 1962, the Cape fishery also caught 69,439 tons of maasbanker (jack mackerel) and 23,395 tons of mackerel. Added to the pilchard landings (452,735 tons), this brought the Cape shoal fish landings for the season to 545,569 tons. Data on landings of maasbanker and mackerel by Cape vessels for the second season in November-December 1962 were not reported. Adding the 1962 South-West Africa pilchard landings of 436,068 tons, the total landings for the fishery were about one million tons.

Excluding production from Cape landings in November and December, the 1962 pilchard-maasbanker-mackerel fishery yielded 4,836,493 cases of canned fish, 222,235 short tons of fish meal, and 58,057 long tons of fish body oil. Of the total, 3,882,723 cases of canned fish, 97,479 short tons of fish meal, and 23,428 long tons of fish body oil were produced in the 6 Walvis Bay factories of South-West Africa. The remainder was produced in the 14 Cape west coast factories of the South Africa Republic.

The January 1963 landings by the South African pilchard fleet of nearly 140 vessels were expected to equal the landings in the first month of 1962. Fish schools were plentiful in the False Bay area, but were scarce north of Cape Town, according to early reports. (The South African Shipping News and Fishing Industry Review, January 1963.)

A Cape west coast pilchard and maasbanker cannery and fish reduction plant.

Note: See Commercial Fisheries Review, January 1963 p. 114.

South Africa Republic and South-West Africa

SPINY LOBSTER EXPORT TRENDS:

South Africa is not in a position to produce and export unlimited quantities of spiny lobster tails as seems to be the general belief in the United States. The statement was made by the Chairman of South African Frozen Rock Lobster Packers (Pty) Ltd. and South-West Africa Frozen Rock Lobster Packers (Pty) Ltd. while on a visit to the United States. In an interview held on March 1, 1963, he outlined the position of the South African spiny lobster industry in general, and gave an explanation of its relationship to the United States market.

In his interview he stated that "Under the South African Government regulations, promulgated many years ago, a Government conservation program was instituted limiting the catch and export of this commodity. Our Government has always considered our fishing grounds as a natural resource which should be given every opportunity to be maintained and protected for the years that lay ahead. The industry has worked with our Department of Fisheries in close collaboration, and the existing fishing regulations are a result of mutual consideration of the problems presented all in the interests of South Africa."

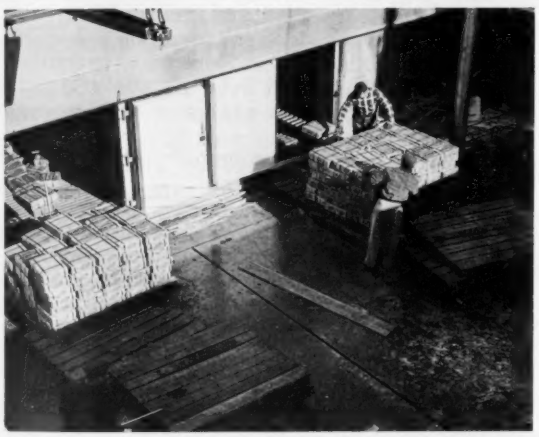


Fig. 1 - View of the unloading of South African rock lobster tails at port of entry.

He said "The main features of our Government regulations are: (1) A limitation on the size of rock lobster permitted to be caught; (2) The proclaiming of sanctuaries where no fishing is permitted; and (3) Prohibition of catching rock lobster in 'berry' (breeding) at any time. These plus the fact that nature, which under our weather conditions, permits only about 150 days fishing per year makes it a real challenge for the producer in fulfilling the quota granted by the Government.

"The maximum permissible export quantity for the year 1963 from the Republic is 6.8 million pounds and from South-West Africa 3.6 million pounds. The aforementioned figures can only be reached subject to good fishing weather and other conditions which are beyond our control, but we can never exceed the quantities mentioned.

"Because of the excellent quality and the desired sizes of rock lobster tails which are produced in the waters of the Republic of South Africa, almost the entire quantity are marketed in the United States, and are distributed mainly to the institutional trade, such as hotels, restaurants, and clubs, as well as to the consumer. The quality of rock lobster tails produced in the waters of South-West Africa are of identical species to those produced in the Republic except, by nature, the sizes are smaller and because of that, marketing of this product is not directed only to the United States. Approximately a half million pounds of the total South-West African quota is utilized for canning purposes, which product sells in the United States, France, England, and many other Western European countries; a further half million pounds of this quota is marketed in France in fresh frozen form. The balance is exported to the United States where it is used mainly in consumer packages under various well established brands.

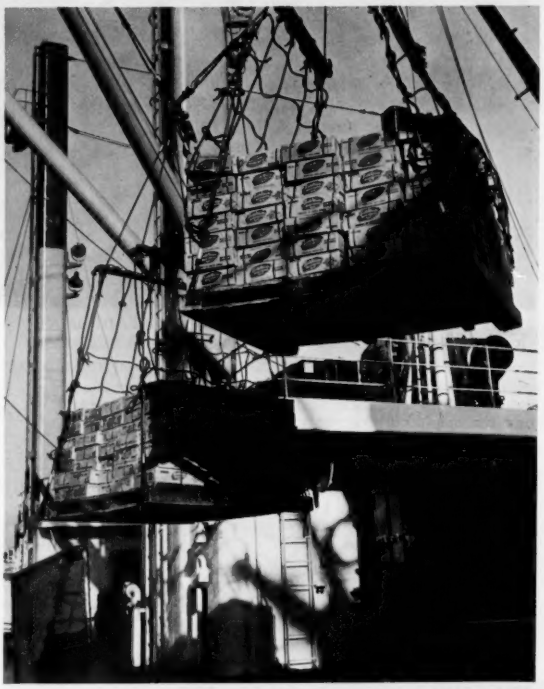


Fig. 2 - Pallets containing South African rock lobster tails being lifted out of hold of vessel onto pier.

"Over the past six months or so, the South African industry has also been experimenting by air-freighting live rock lobster to France. These experiments are proving successful. Every week approximately 6,000 pounds of live rock lobster are flown from Cape Town to Paris.

"Additional experiments are also being made to produce and ship whole cooked, frozen rock lobster, and several small consignments have been shipped to Western Europe, the result of which at this stage are not known as yet, but I confidently believe they will prove equally successful.

"We are very proud of our market in the United States developed over a period of 25 years, first serving the East Coast and gradually expanding because of ready acceptance of our product to where we now serve several of the larger distribution centers across the nation.

"In the post-war years, advertising and public relations programs spread the news of our product so that enumerable users became repeated supporters of South African rock lobster tails.

"The foregoing affords you a well-rounded out picture of what we, the producers, are faced with and what has taken place here in the United States. Taking all these factors into consideration: (1) Strict Government regulations for conser-

South Africa Republic and South-West Africa (Contd.):

Fig. 3 - Stacking of pallets with cartons of South African rock lobster on pier prior to loading into trucks.

vation; (2) Ability to catch the amount of the permissible quota; and (3) The maintaining of traditional and opening of new European outlets--only one conclusion can be drawn.

"Our industry will continue exporting to our staunch supporters--the American market--but we regret that the quantity cannot be increased and must be held within the limitations placed upon us as I have outlined in these remarks."

South-West Africa

POLISH STERN TRAWLER VISITS WALVIS BAY FOR SUPPLIES:

During December last year, the 2,880-gross-ton Polish stern trawler Neptun called at Walvis Bay, South-West Africa, for stores and oil. The Neptun, which is owned by a fishing company in Gdynia, Poland, had been operating on the same fishing grounds as the Russians, the Kunene River mouth on the northern border of South-West Africa.

According to her skipper, the vessel was on her maiden voyage and at that time was the only Polish fishing ship operating in those waters. He stated that they had already caught more than 900 tons of fish which had been frozen or processed into fish meal. The frozen fish was to be sold in Nigeria and the fish meal taken back to Poland.

In addition to the 100 Polish crew members, there were also 16 Nigerians who had been engaged when the vessel had called earlier at Lagos on her outward voyage.

The Neptun was not connected, nor was she fishing with the Russian fleet trawling in the same waters.

It is understood that there are now six Polish trawlers operating off South-West Africa and that some of the vessels were due to call at Walvis Bay during February to take on stores and oil. (The South African Shipping News and Fishing Industry Review, February 1963.)

Note: See Commercial Fisheries Review, February 1963 p. 87.

United Kingdom

ABERDEEN TRAWLERS SEEK NEW FISHING GROUNDS IN DEEP WATER:

The Aberdeen trawler Summerlee returned on January 22, 1963, from an experimental trip to the deep-water zone between the Shetland Islands and Norway with 380 boxes of fish valued at over £1,800 (US$5,040). This was the best in a series of experimental trips undertaken to find new fishing grounds which will offset the proposed extension of the Faroese fishing limits.

A spokesman for the White Fish Authority, which is participating in the experiments, said that the result was very encouraging. He said that the vessel fished at depths of 90-170 fathoms and could, if necessary, have fished at 200 fathoms. The catch was mainly large whiting, cod, and ling. Haddock had been very scarce. Dutch, German, and French trawlers were fishing in the area.

The factor of importance in these tests is in the depth fished. In the past, the Scottish trawler fleet has taken the view that it could not work successfully in really deep water. Most of the trawling was done at a maximum depth of 70 fathoms.

With the new type of French gear there would appear to be no good reason why the fleet should not move into deeper water and thus greatly increase the area in which it can work. The Summerlee and another Aberdeen trawler have been making this type of experiment for several months. They have made successful trips to Atlantic deep-water grounds.

The Summerlee will make another trip to the same area, after which the White Fish Authority will issue a report to trawler own-

United Kingdom (Contd.):

ers on the entire project. The Authority has shared the cost of the experiments with the Aberdeen Fishing Vessel Owners' Association and the Department of Agriculture and Fisheries. (Fish Trades Gazette, January 26, 1963.)

* * * * *

BOXING FISH AT SEA IMPROVES QUALITY:

Boxing fresh fish at sea protects the fish from crushing, speeds unloading, and prevents damage by hooks, according to a British fishery firm in Hull. Boxing fish at sea was tried aboard a British distant-water trawler during a 3,400-mile round trip to Greenland. Some of the boxed fish was 16 day old when landed by the vessel. Its good quality convinced the British firm to apply the boxing system to some of its other vessels. (Fish Trades Gazette, January 26, 1963.)

* * * * *

POSTGRADUATE TRAINING IN FISHERY RESEARCH AIDED BY GRANTS:

Postgraduate training grants in fishery research, effective October 1, 1963, are to be awarded by the British Development Commission in association with the Ministry of Agriculture and Fisheries and the Department of Agriculture and Fisheries for Scotland.

To attract students it is intended to widen the field of study to include such subjects as mathematics, physics, geography, and engineering.

The grants are intended to enable selected candidates to undergo a specified course of training to fit them for the investigation of problems in marine or freshwater science.

The Commissioners will consider applications from candidates for permission to register for a higher degree in circumstances where this seems likely to be consistent with the requirements of the approved fishery research training program.

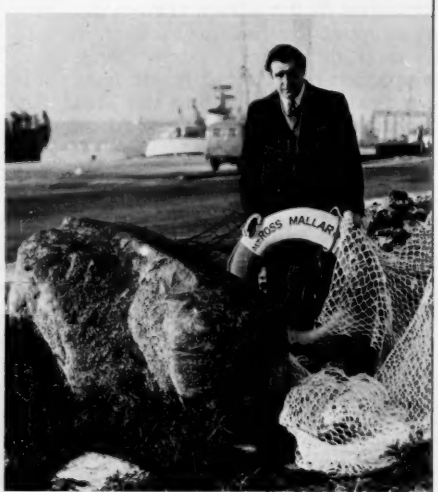
Awards do not carry any guarantee of subsequent employment nor do they entail any obligation to accept such employment, but the training should fit students for employment either in the fishery research service or in a marine or freshwater biological research institution. (Fishing News, recent date.)

LARGE GLACIAL BOULDER LANDED BY BRITISH TRAWLER

An outsize, 2½-ton, glacial boulder, believed to be the largest ever raised off the sea bed by conventional trawl gear, was landed at Grimsby in early December 1962 by the British trawler Ross Mallard.

Caught off the Dogger Bank, and sharing the same net with seven baskets of plaice and soles, this gigantic rock would still be a menace to trawlermen were it not for the great strength of the polypropylene cod end which the Ross Mallard was using. That the cod end is still fit for service should dispel any doubts about the strength of this synthetic material.

Speculation is inevitable. From the firm that owns the trawler comes the estimate that the boulder--a deposit from melting glacial ice of the Ice Age--has probably gone through a thousand cod ends.



The 2½-ton glacial boulder being exhibited by the captain of the trawler Ross Mallard.

FEDERAL ACTIONS

Department of Commerce

AREA REDEVELOPMENT ADMINISTRATION

ALASKA ICE AND COLD-STORAGE FIRM AWARDED LOAN FOR PLANT EXPANSION:

A $260,000 industrial loan application from the Alaska Ice and Storage, Inc., Kodiak, Alaska, has been approved by the Area Redevelopment Administration (ARA) of the Department of Commerce. The loan is to help finance a $400,000 plant expansion program for storing and processing fish. In the past, Alaska Ice and Storage, Inc., has handled limited quantities of salmon and halibut during the fishing season. The expanded facilities will make it possible for the firm to almost double its capacity and in addition to salmon and halibut will be able to handle king and Dungeness crab and shrimp. With the new facilities. the operation will be on a more or less year-round basis.

The expanded operation will provide employment for about 120 people in Kodiak. It is estimated that at least 60 additional jobs will be created in the allied trades and services that support the fishing industry of this officially designated redevelopment area. This investment of Federal funds is expected to make a real contribution to the local Kodiak economy, as well as that of Alaska.

Department of Health, Education and Welfare

FOOD AND DRUG ADMINISTRATION

PERMISSION TO WEIGH PACKAGED FROZEN FISH FILLETS AT TIME OF SALE PROPOSED:

In a "statement of general policy or interpretation," the U. S. Food and Drug Administration announced on November 28, 1962 (Federal Register, December 4, 1962), the cancellation of the exemption to producers of individually-or-consumer-wrapped frozen fish fillets to omit the net-weight statement on the wrappers of fish fillets that are prepackaged in cellophane or similar films. Since April 25, 1940, the producers of individually wrapped frozen fillets have been permitted to substitute statements or instructions on the label with the following: "that the article is to be weighed and marked at time of retail sale." On April 4, 1963 (Federal Register, April 10, 1963), the Food and Drug Administration after considering additional data supplied by the fishing industry on past and current trade practices in the marketing of certain types of frozen fish fillets, announced a proposal to continue the exemption from the net weight labeling law. The announcement dated April 4, 1963, as it appeared in the April 10, 1963, Federal Register follows:

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Food and Drug Administration

[21 CFR Part 1]

WRAPPED FISH FILLETS

Proposed Exemption From Certain Labeling Requirements

Following publication in the FEDERAL REGISTER of December 4, 1962 (27 F.R. 11943), of the policy statement § 3.204 *Net weight statement on foods in package form that may be weighed at time of retail sale,* representatives of the fishery industry supplied additional data about past and current trade practices in the marketing of certain types of frozen fish fillets. Acting on this and other information, the Commissioner of Food and Drugs has concluded that a special exempting provision should be added to the regulations implementing section 405 of the Federal Food, Drug, and Cosmetic Act.

Therefore, the Commiasioner, under the authority provided in the Federal Food, Drug, and Cosmetic Act (secs. 403 (e)(2), 405, 701(a), 52 Stat. 1046 as amended, 1049, 1055; 21 U.S.C. 343(e)(2), 345, 371(a)), and delegated to him by the Secretary of Health, Education, and Welfare (25 F.R. 8625), proposes to amend § 1.13 *Food; exemptions from labeling requirements* by adding a new paragraph (g), as follows:

§ 1.13 Food; exemptions from labeling requirements.

* * * * *

(g) Wrapped fish fillets of nonuniform weight intended to be unpacked and marked with the correct net weight at the point of retail sale at an establishment other than where originally packed, shall be exempt from the requirements of section 403(e)(2) of the act during introduction and movement in interstate commerce and while held for sale prior to weighing and marking, if the outside container bears a label declaration of the total net weight, the individual packages bear a conspicuous statement "To be weighed at time of sale," and it is the practice in the retail establishment to weigh and mark the individual packages with a net-weight statement at the time of sale. The act of delivering the wrapped fish fillets at time of retail sale without the correct net-weight statement shall be deemed an act which results in the product being misbranded while held for sale.

Any interested person may, within 30 days from the publication of this notice in the FEDERAL REGISTER, submit written views and comments on this proposal. Such comments should be submitted in triplicate and addressed to the Hearing Clerk, Department of Health, Education, and Welfare, Room 5440, 330 Independence Avenue SW., Washington 25, D.C.

Dated: April 4, 1963.

GEO. P. LARRICK,
Commissioner of Food and Drugs.

Interstate Commerce Commission

HEARINGS ON MOTOR CARRIER RATES FOR FISH AND SHELLFISH SCHEDULED:

On the request of the railroads, the Interstate Commerce Commission (ICC) has begun an investigation of the motor carriers' rate structure for fish and shellfish and certain other formerly exempt commodities. The investigation is not limited to grandfather rates; it applies to all common carrier rates. It appears that some interests wish to have all motor carrier rates fixed at a minimum level based on the operating costs of large general commodity haulers.

The first in a series of country-wide hearings in ICC Docket 32912--Rates on Formerly Exempt Commodities--was held in Washington, D. C., March 11-14, 1963, to introduce the ICC's cost study and to hear the Eastern motor carriers' defense of their rates. The next hearing was tentatively scheduled for April 17 in Atlanta, Ga., for evidence on Southern regional costs and rates. Additional hearings were planned in Kansas City, Kans., on April 22, and Los Angeles, Calif., on April 29. Hearings were also planned in San Francisco, Calif., and Portland, Oreg., after which a final hearing will be held in Washington, D. C.

Department of Labor

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS

NEW MINIMUM WAGE RATES FOR TUNA CANNERY WORKS IN PUERTO RICO ANNOUNCED:

A new minimum wage rate of $1.25 per hour for the tuna-canning industry in Puerto Rico, will become effective November 3, 1963. The new rate was announced on March 23, 1963, by the U. S. Labor Department's Wage and Hour and Public Contracts Divisions. The current minimum wage for tuna cannery workers in Puerto Rico, is $1.15 per hour.

The new rate reflects the 10-percent automatic increase for industries in Puerto Rico, prescribed by the 1961 amendments to the Fair Labor Standards Act. The amendments provide that employers in Puerto Rico can apply to the Secretary of Labor for appointment of a review committee to recommend minimum wage rates to be paid in lieu of the rates resulting from the 10-percent statutory increase. Such applications must be filed with the Secretary of Labor between July 6, and September 4, 1963.

Note: See Commercial Fisheries Review, February 1963, p. 94, October 1961, p. 86, and August 1961, p. 98.

White House

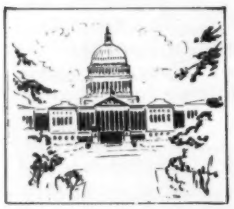
ACCEPTS RECOMMENDATION TO PERMIT JAPANESE TO FISH FOR HALIBUT IN EASTERN BERING SEA:

The President on March 23, 1963, took action in accordance with the North Pacific Fisheries Act of 1954, to accept the recommendation of the International North Pacific Fisheries Commission which, if accepted by Canada, Japan, and the United States, will permit the Japanese to fish for halibut in the Eastern Bering Sea along with United States and Canadian fishermen. A statement issued

from the White House said, "In reaching this decision, we have not only taken into account our international obligations, but also the domestic factors which have come to our attention. We consider that this action advances the cause of the principle of abstention which is at the heart of the Tripartite Fisheries Treaty of 1952, and which provides a reasonable, workable, and essential procedure for dealing with certain major North Pacific Fisheries problems. We are determined to work for the continuation of this principle and of the Treaty in which it is set forth. We are cognizant of the Commission's recent successful efforts to develop conservation measures which, if accepted by the three parties to the Tripartite Fisheries Treaty, will provide suitable protection for Eastern Bering Sea halibut. This action will not take effect until the Canadian Government takes similar action."

Eighty-Eighth Congress

(First Session)



Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ALASKA FISHING LIMITS: The House on Apr. 8, 1963, and the Senate on Apr. 9, 1963, were presented with a resolution from the Senate of the State of Alaska (Senate Joint Resolution 10), relating to the territorial waters of Alaska. The resolution states the fisheries abutting the Alaska coast are of enormous economic value and represent the sole source of livelihood for scores of American nationals; American nationals have fished for years under carefully planned and stringent conservation regulations imposed to insure maximum sustained yield from the resource; recent years have seen an increased amount of foreign fishing effort in the waters surrounding the Alaska coast; the alien fishermen fish entirely free of conservation restrictions imposed on American citizens; that the U.S. Government, charged with the obligation of protecting American fisheries from foreign encroachment, has taken insufficient action to protect the resource either through assertion of a greater territorial belt of water than 3 miles or application of the so-called base line method already sanctioned for use by the International Court of Justice; and the Governor of the State of Alaska has attempted unceasingly to impress upon the U.S. Government the gravity of intrusions by foreign nationals into waters historically considered American and the necessity of establishing a broad claim to waters adjoining the Alaska coast; and the Governor, faced with the complete lack of action on the part of the U.S. Government, has acted courageously in protecting the fisheries of Alaska through State action which circumstances required. Referred to the Senate Committee on Commerce and the House Committee on Merchant Marine and Fisheries.

ANTIDUMPING ACT AMENDMENT: S. 1318 (Humphrey et al) introduced in Senate Apr. 11, 1963, to amend the Antidumping Act 1921; referred to the Committee on Finance. The objective of the U.S. Antidumping Act is to prevent foreign manufacturers from injuring American industries by dumping surplus merchandise here at prices below those charged in the exporting country. If the Treasury Department finds a price differential, and the Tariff Commission finds an American industry is injured, the foreign manufacturer must pay the differential to the Treasury in dumping duties. The bill would make the Act more effective in achieving its original purpose and to help insure that international trade will be conducted in a fair and equitable manner. Would also prevent Soviet bloc exports from disrupting free world trade. Companion bills introduced in the House Apr. 11, 1963, were: H. R. 5693 (Thompson), H. R. 5694 (Byrne), H. R. 5695 (Curtin), H. R. 5696 (Daniels), H. R. 5697 (Dent), H. R. 5698 (Ding), H. R. 5699 (Milliken), H. R. 5700 (Philbin), and H. R. 5701 (Tupper); all referred to the House Committee on Ways and Means.

ATOMIC ENERGY COMMISSION: S. Doc. 6, Annual Report to Congress of the Atomic Energy Commission for 1962 (U.S. Senate 88th Congress, 1st Session), 621 pp., printed. Contains the reports on the Commission action, nuclear power programs, production and weapons program; other major programs; and regulatory activities. Included is a report of the program on the radiation pasteurization of food. Research results obtained thus far in the Commission's 5-year research and development program indicate that radiation is effective for preserving foods in the manner envisioned, such as low doses of radiation, etc. Some of the foods thus far tested with good results have been strawberries, peaches, haddock, and clams. The first public display of low-dose radiation-pasteurized food was made during the year at the Fifth International Food Congress and Exhibition in New York City. The items displayed were fish and fruit products--crab, shrimp, flounder, strawberries, grapes, lemons, and nectarines. The Bureau of Commercial Fisheries Technological Laboratories at Gloucester, Mass. and Seattle, Wash., are coordinating with the Commission on various studies being made on clams, haddock, crab, and flounder.

CHEMICAL PESTICIDES COORDINATION: S. 1250 (Neuberger) introduced in Senate Apr. 2, 1963, to provide for advance consultation with the Fish and Wildlife Service and with State wildlife agencies before the beginning of any Federal program involving the use of pesticides or other chemicals designed for mass biological controls; referred to Committee on Commerce. Also H. R. 5589 (Conte) introduced in House Apr. 10, 1963; referred to House Committee on Merchant Marine and Fisheries.

S. 1251 (Neuberger) introduced in Senate Apr. 2, 1963, to amend the act of August 1, 1958, in order to

prevent or minimize injury to fish and wildlife from the use of insecticides, herbicides, fungicides, and pesticides; referred to Committee on Commerce. Also H. R. 5588 (Conte) introduced in the House on Apr. 10, 1963; referred to House Committee on Merchant Marine and Fisheries.

COMMERCIAL FISHERIES FUND: The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce held hearings on Apr. 24 and 25, on S. 627, to amend the Act of August 11, 1939, relating to domestically produced fishery products to establish a fund for the advance of commercial fisheries.

H. R. 5539 (Bonner) and H. R. 5561 (Bates) introduced in House Apr. 9, 1963, to promote State commercial fishery research and development projects, and for other purposes; both referred to the Committee on Merchant Marine and Fisheries.

COMMODITY PACKAGING AND LABELING: H. R. 5331 (Kastenmeier) introduced in House Apr. 1, 1963, to amend the Clayton Act to prohibit restraints of trade carried into effect through the use of unfair and deceptive methods of packaging or labeling certain consumer commodities distributed in commerce, and for other purposes; referred to Committee on the Judiciary. Also H. R. 5027 (Gilbert) introduced in the House Mar. 21, 1963; to Committee on the Judiciary.

DELAWARE RIVER BASIN: H. Doc. 522, Volume VII, Delaware River Basin, New York, New Jersey, Pennsylvania, and Delaware (Letter from the Secretary of the Army transmitting a letter from the Chief of Engineers, Department of the Army, dated April 2, 1962, submitting a report, together with accompanying papers and illustrations, on a review of the Delaware River and tributaries, requested by a resolution of the Committee on Public Works, United States Senate, adopted April 13, 1950, and other resolutions of that Committee of the Committee on Public Works, House of Representatives, listed in the report, House of Representatives, 87th Congress, 2nd Session), 176 pp., illus., printed. Contains Appendix N, General Geology and Ground Water, a report by the U. S. Geological Survey for and in cooperation with the Corps of Engineers, as a guide to the better understanding of the Delaware River service area.

EXEMPT TRANSPORTATION OF AGRICULTURAL AND FISHERY PRODUCTS: The House Committee on Interstate and Foreign Commerce began hearings on Apr. 30, 1963, on H. R. 4700, to exempt certain carriers from minimum rate regulation in the transportation of bulk commodities, agricultural and fishery products, and passengers, and for other purposes.

H. R. 5201 (Harris) introduced in House Mar. 28, 1963, to amend Section 203 (b) (6) of the Interstate Commerce Act, as amended, so as to limit the application of the exemptions provided therein, and for other purposes; referred to the Committee on Interstate and Foreign Commerce. The present law provides the exemption for "motor vehicles used in carrying property consisting of ordinary livestock, fish (including shellfish), or agricultural (including horticultural) commodities (not including manufactured products thereof), if such vehicles are not used in carrying any other property, or passengers, for compensation. . ." The bill changes this language to read "motor vehicles or combinations thereof having together a total of not more than three axles used in carrying property consisting of ordinary livestock, fish (including shellfish), or agricultural (including horticultural) commodities (not including manufactured products thereof), if such motor vehicles or combinations thereof are not used in carrying any other property, or passengers, for compensation."

The Subcommittee on Surface Transportation of the Senate Committee on Commerce began hearings on May 6, 1963, on S. 1061, to exempt certain carriers from minimum rate regulation in the transportation of bulk commodities, agricultural and fishery products, and passengers.

FISHERY MARKETING ACT AMENDMENT: The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce held hearings on May 8, 1963, on S. 1135, to make clear that fishermen's organizations, regardless of their technical legal status have a voice in the ex-vessel sale of fish or other aquatic products on which the livelihood of their members depends.

INTERIOR DEPARTMENT APPROPRIATIONS FY 1964: The House on Apr. 2, 1963, passed by voice vote H. R. 5279, making appropriations for the Department of the Interior and related agencies for the fiscal year ending June 30, 1964, and for other purposes. Included are funds for the Fish and Wildlife Service, its two bureaus, Commercial Fisheries and Sport Fisheries and Wildlife, and the Office of the Commissioner. The Senate on Apr. 3, 1963, received the bill from the House and referred it to the Committee on Appropriations.

MEDICAL CARE FOR VESSEL PERSONNEL: The Senate on Apr. 15, 1963, was presented with a resolution of the Senate of the State of Alaska (Senate Resolution 58) urging Congress to approve the restoration of medical care rights to owner-operators of vessels and self-employed seamen by the passage of H. R. 2108, to provide medical care for certain persons engaged on board a vessel in the care, preservation, or navigation of such vessel. Referred to the Senate Committee on Commerce.

The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce held hearings on Apr. 24 and 25, 1963, on S. 978, to provide medical care for certain persons engaged on board a vessel in the care, preservation, or navigation of such vessel.

The House on Apr. 22, 1963, was presented with a resolution of the Senate of the State of Alaska memorializing the President and the Congress of the United States relative to restoration of Federal medical care for persons employed or engaged on vessels; referred to the Committee on Interstate and Foreign Commerce. This resolution urges Congress to approve passage of H. R. 2108, to provide medical care for certain persons engaged on board a vessel in the care, preservation, or navigation of such vessel.

METRIC SYSTEM STUDY: S. 1278 (Pell) introduced in Senate Apr. 4, 1963, to provide that the National Bureau of Standards shall conduct a program of investigation, research, and survey to determine the practicability of the adoption by the United States of the metric system of weights and measures; referred to the Committee on Aeronautical and Space Sciences. In the Senate on Apr. 22, 1963, Senator Neuberger was added as additional co-sponsor of the bill.

OUTDOOR RECREATION BUREAU: H. Rept. 160, Promoting the Coordination and Development of Effective Programs Relating to Outdoor Recreation (A report from the House Committee on Interior and Insular Affairs, to accompany H. R. 1762), 9 pp., printed. The Committee favorably reported the bill with amendments and recommended passage. Contains purpose and background; contents of the bill, Committee amendments; and costs.

The House Committee on Rules Apr. 4, 1963, reported H. Res. 306, for consideration of H. R. 1762, to promote the coordination and development of effective Federal and State programs relating to outdoor recreation, and for other purposes; referred to the House Calendar. This is an open rule providing for the consideration of and 1 hour debate on H. R. 1762.

PACIFIC ISLANDS TRUST TERRITORY DEVELOPMENT: House Committee on Interior and Insular Affairs held hearings on Apr. 29-30, 1963, on H. R. 3198, to promote the economic and social development of the Trust Territory of the Pacific Islands, and for other purposes. Bill would amend the Tariff Act of 1930 to consider the Pacific Trust Territory as an insular possession of the United States in regard to duty-free importation into the U. S. This provision, however, would not apply to fishery products processed in the Trust Territory unless such fish were landed from U. S. flag vessels or Trust Territory vessels "Manned by crews, two-thirds of which are citizens of the U. S. or the Trust Territory."

SANITATION REGULATIONS FOR IMPORTED SHELLFISH: H. R. 1770 (Colmer) introduced in House Jan. 14, 1963, to amend the Public Health Service Act to provide for certain investigations and studies by the Surgeon General of the United States. Provides for investigations and studies in foreign countries relating to sanitary control of the shellfish industries. It would prohibit importation of shellfish from any country in which sanitary standards and practices are lower than the minimum requirements prescribed by the Public Health Service for the United States industry. Bill was referred to the Committee on Interstate and Foreign Commerce.

STERN RAMP TRAWLER: The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce held hearings on Apr. 24 and 25, 1963, on S. 744, to authorize the Secretary of the Interior to construct 2 modern stern ramp trawlers to be used for research, and for other purposes. The House on Apr. 8, 1963, and the Senate on Apr. 9, 1963, were presented with a resolution of the Senate of the State of Alaska (Senate Joint Resolution 21), urging Congress to act favorably on S. 744, to authorize the Secretary of the Interior to construct two modern stern ramp trawlers to be used for research, and other purposes. The resolution states: the high-seas fish resources of the United States are being ravaged by fleets of modern trawlers operated by foreign nations; the fishing fleets of the U. S. have never received the attention and encouragement necessary to permit our fishermen to compete successfully with the vast, efficient and modern foreign fleets; and the construction by the Federal Government of two stern ramp trawlers would make available American vessels which could be used for exploratory and scientific investigations of the fisheries resources of the high seas. Referred to the Senate Committee on Commerce, and the House Committee on Merchant Marine and Fisheries.

SUPPLEMENTAL APPROPRIATIONS FY 1963: H. R. 5517 (Thomas) introduced in House Apr. 5, 1963. The bill was reported favorably (H. Rept. 198), to the House by the Committee on Appropriations on the same day. Included are funds for the Department of the Interior. The Committee recommended $658,400 for the Bureau of Commercial Fisheries, including the budget estimate of $400,000 for research and development on processes to produce fish protein concentrate and $258,400 to cover part of the cost of pay increases. The House on Apr. 10, 1963, passed by a voice vote H. R. 5517. The Senate Apr. 11, 1963, received from the House H. R. 5517; referred to the Senate Committee on Appropriations.

H. Rept. 198, Supplemental Appropriation Bill, 1963 (Apr. 5, 1963, report from the Committee on Appropriations, House of Representatives, 88th Congress, 1st Session to accompany H. R. 5517), 27 pp., printed. The Committee considered budget estimates of $1,641,507,106 and has recommended for appropriation $988,756,506. Included are funds for the Bureau of Commercial Fisheries, the Committee recommended $400,000 for research and development on processes to produced fish protein concentrate and $258,400 to cover part of the cost of pay increases.

TRANSPORTATION ACT OF 1963: The House Committee on Interstate and Foreign Commerce began hearings on Apr. 30, 1963, on H. R. 4701, to provide for strengthening and improving the national transportation system and for other purposes.

The Subcommittee on Surface Transportation of the Senate Committee on Commerce began hearings on May 6, 1963, on S. 1062, to provide for strengthening and improving the national transportation system and for other purposes.

VESSEL CONSTRUCTION SUBSIDY AMENDMENTS: The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce began hearings May 7, 1963, on S. 1006, to amend the Act of June 12, 1960, for the correction of inequities in the construction of fishing vessels, and for other purposes.

WATER POLLUTION CONTROL ADMINISTRATION: H. R. 5740 (Rodino) introduced in Senate Apr. 22, 1963, to amend the Federal Water Pollution Control Act, as amended, to establish the Federal Water Pollution Control Administration, to increase grants for construction of municipal sewage treatment works, to provide financial assistance to municipalities and others for the separation of combined sewers, to authorize the issuance of regulations to aid in preventing, controlling, and abating pollution of interstate or navigable waters, and for other purposes; referred to the Committee on Public Works.

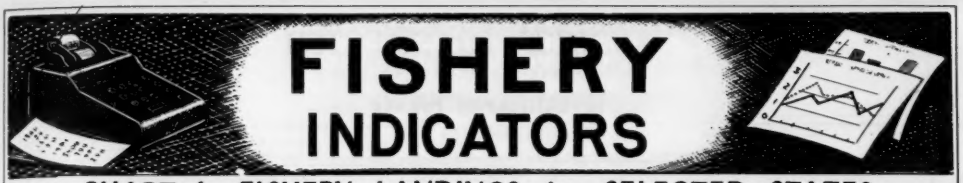
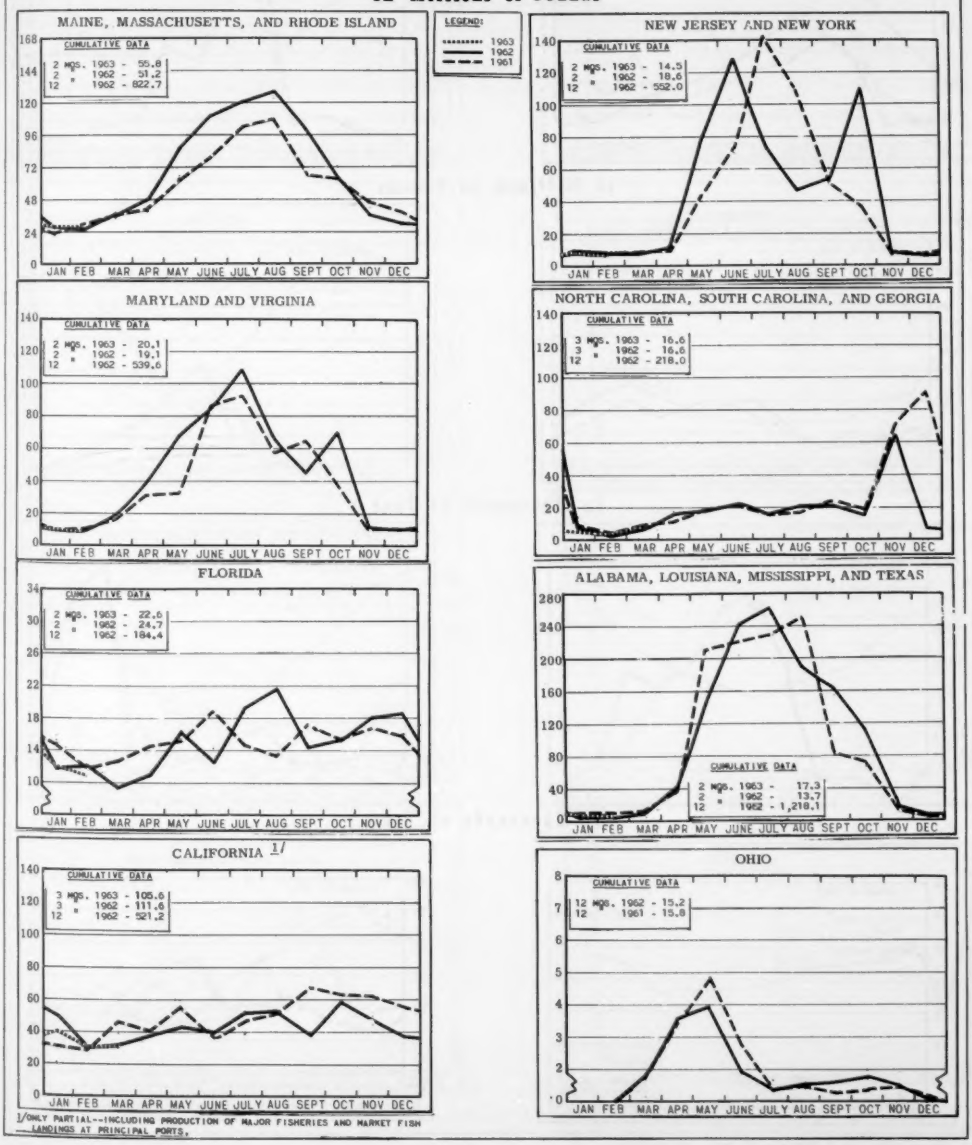


CHART 1 - FISHERY LANDINGS for SELECTED STATES

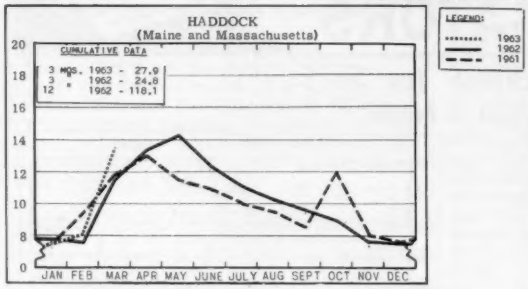
In Millions of Pounds

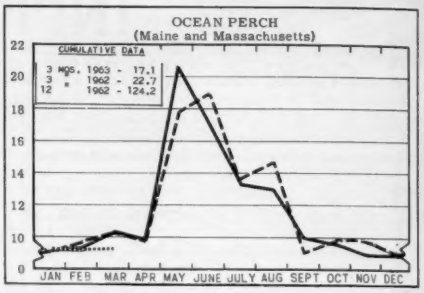

MAINE, MASSACHUSETTS, AND RHODE ISLAND
CUMULATIVE DATA
2 MOS. 1963 - 55.8
2 " 1962 - 51.2
12 " 1962 - 822.7
LEGEND:
1963
1962
1961
NEW JERSEY AND NEW YORK
CUMULATIVE DATA
2 MOS. 1963 - 14.5
2 " 1962 - 18.6
12 " 1962 - 552.0
MARYLAND AND VIRGINIA
CUMULATIVE DATA
2 MOS. 1963 - 20.1
2 " 1962 - 19.1
12 " 1962 - 539.6
NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA
CUMULATIVE DATA
3 MOS. 1963 - 16.6
3 " 1962 - 16.6
12 " 1962 - 218.0
FLORIDA
CUMULATIVE DATA
2 MOS. 1963 - 22.6
2 " 1962 - 24.7
12 " 1962 - 184.4
ALABAMA, LOUISIANA, MISSISSIPPI, AND TEXAS
CUMULATIVE DATA
2 MOS. 1963 - 17.3
2 " 1962 - 13.7
12 " 1962 - 1,218.1
CALIFORNIA 1/
CUMULATIVE DATA
3 MOS. 1963 - 105.6
3 " 1962 - 111.6
12 " 1962 - 521.2
OHIO
CUMULATIVE DATA
12 MOS. 1962 - 15.2
12 " 1961 - 15.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

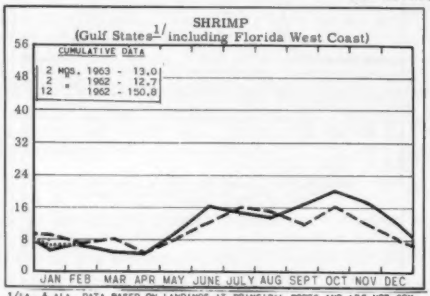
CHART 2 - LANDINGS for SELECTED FISHERIES

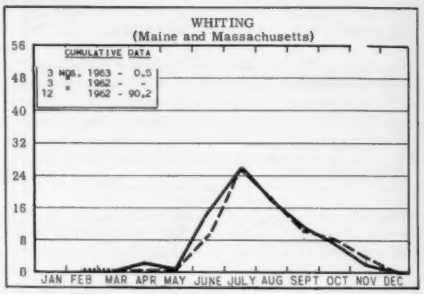
In Millions of Pounds




OCEAN PERCH
(Maine and Massachusetts)
CUMULATIVE DATA
3 MOS. 1963 - 17.1
3 " 1962 - 22.7
12 " 1962 - 124.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

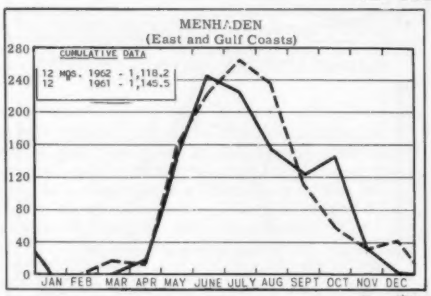
In Millions of Pounds

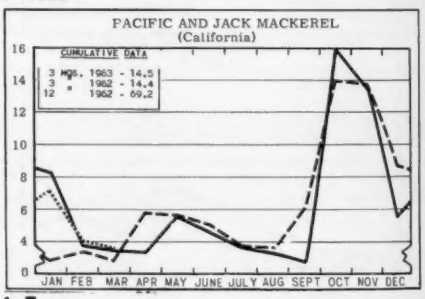

SHRIMP
(Gulf States 1/ including Florida West Coast)
CUMULATIVE DATA
2 MOS. 1963 - 13.0
2 " 1962 - 12.7
12 " 1962 - 150.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


WHITING
(Maine and Massachusetts)
CUMULATIVE DATA
3 MOS. 1963 - 0.5
3 " 1962 - .
12 " 1962 - 90.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

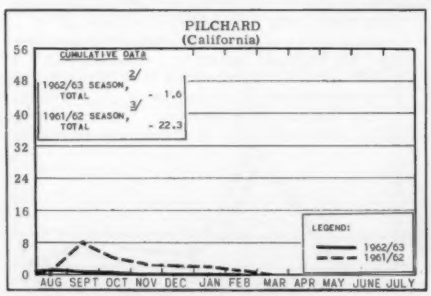
1/ La. & Ala. data based on landings at principal ports and are not complete.

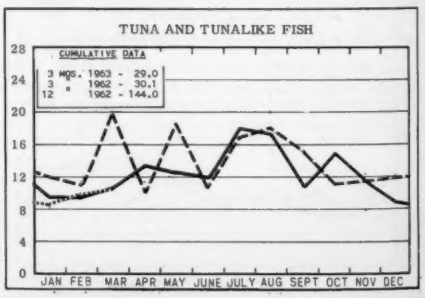
In Thousands of Tons


MENHADEN
(East and Gulf Coasts)
CUMULATIVE DATA
12 MOS. 1962 - 1,118.2
12 " 1961 - 1,145.5
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


PACIFIC AND JACK MACKEREL
(California)
CUMULATIVE DATA
3 MOS. 1963 - 14.5
3 " 1962 - 14.4
12 " 1962 - 69.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons

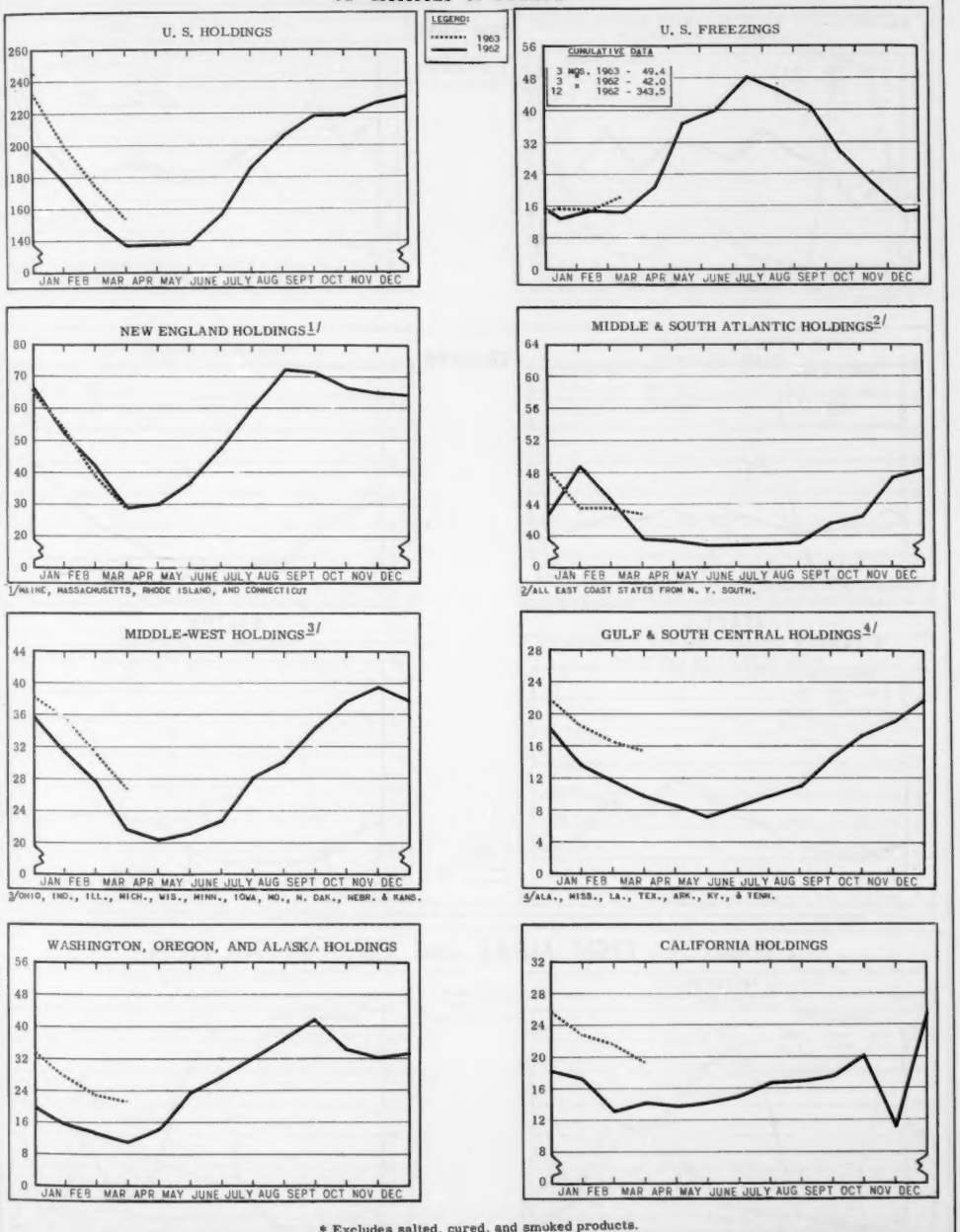



TUNA AND TUNALIKE FISH
CUMULATIVE DATA
3 MOS. 1963 - 29.0
3 " 1962 - 30.1
12 " 1962 - 144.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

2/ Season total, Aug. 1, 1962-Feb. 28, 1963. 3/ Season total, Aug. 1, 1961-Feb. 28, 1962.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. HOLDINGS
LEGEND:
1963
1962
U. S. FREEZINGS
CUMULATIVE DATA
3 MOS. 1963 - 49.4
3 " 1962 - 42.0
12 " 1962 - 343.5
NEW ENGLAND HOLDINGS 1/
MIDDLE & SOUTH ATLANTIC HOLDINGS 2/
MIDDLE-WEST HOLDINGS 3/
GULF & SOUTH CENTRAL HOLDINGS 4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT

2/ALL EAST COAST STATES FROM N. Y. SOUTH.

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

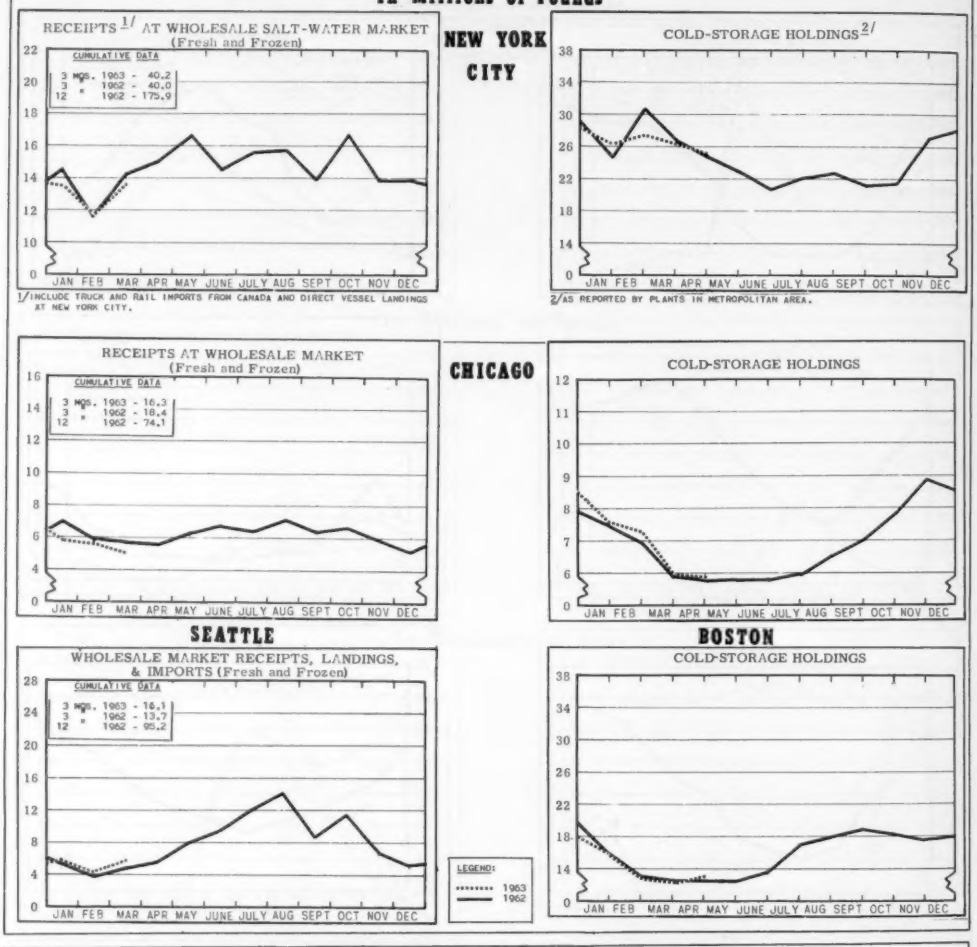

RECEIPTS 1/ AT WHOLESALE SALT-WATER MARKET
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 40.2
3 " 1962 - 40.0
12 " 1962 - 175.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.
NEW YORK CITY
COLD-STORAGE HOLDINGS 2/
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.
RECEIPTS AT WHOLESALE MARKET
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 16.3
3 " 1962 - 18.4
12 " 1962 - 74.1
CHICAGO
COLD-STORAGE HOLDINGS
SEATTLE
WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 16.1
3 " 1962 - 13.7
12 " 1962 - 95.2
BOSTON
COLD-STORAGE HOLDINGS
LEGEND:
1963
1962

CHART 5 - FISH MEAL and OIL PRODUCTION

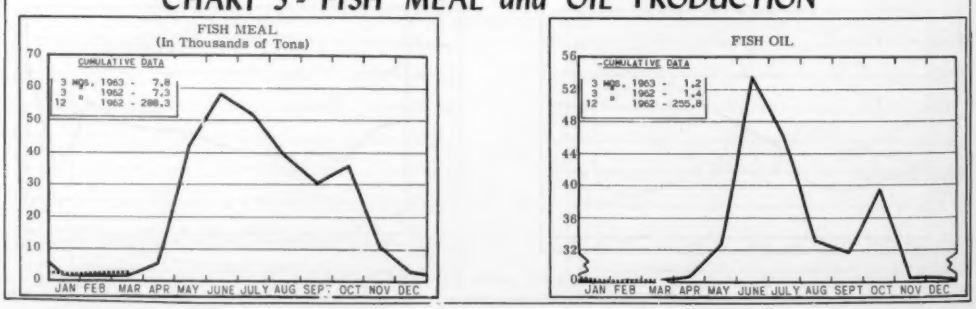
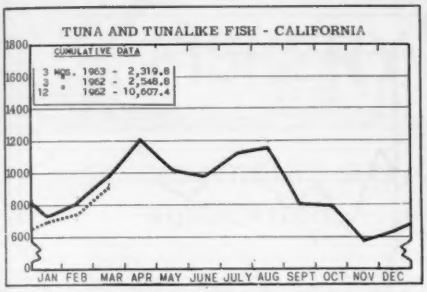
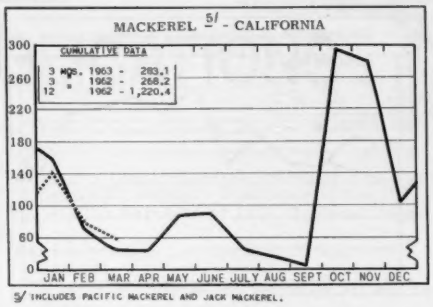

FISH MEAL
(In Thousands of Tons)
CUMULATIVE DATA
3 MOS. 1963 - 7.8
3 " 1962 - 7.3
12 " 1962 - 288.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
FISH OIL
CUMULATIVE DATA
3 MOS. 1963 - 1.2
3 " 1962 - 1.4
12 " 1962 - 255.8

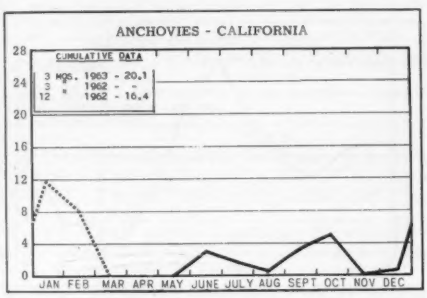
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

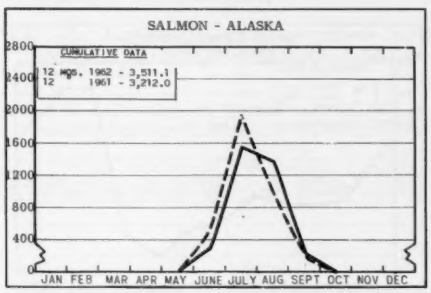
In Thousands of Standard Cases

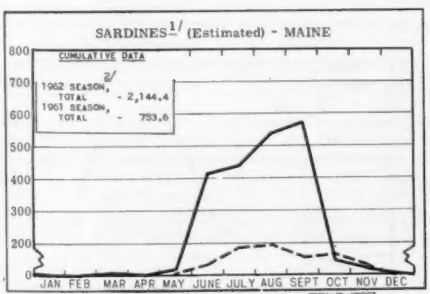




5/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



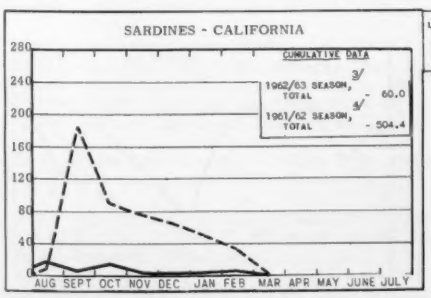


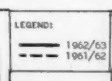


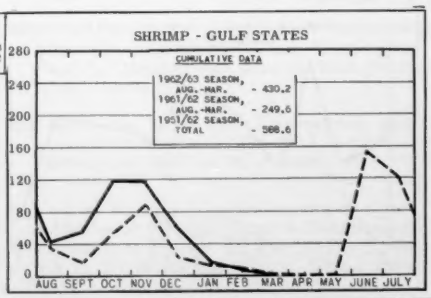
1/ INCLUDING SEA HERRING. 2/ THE 1962 SEASON STARTED DEC. 2, 1961.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.



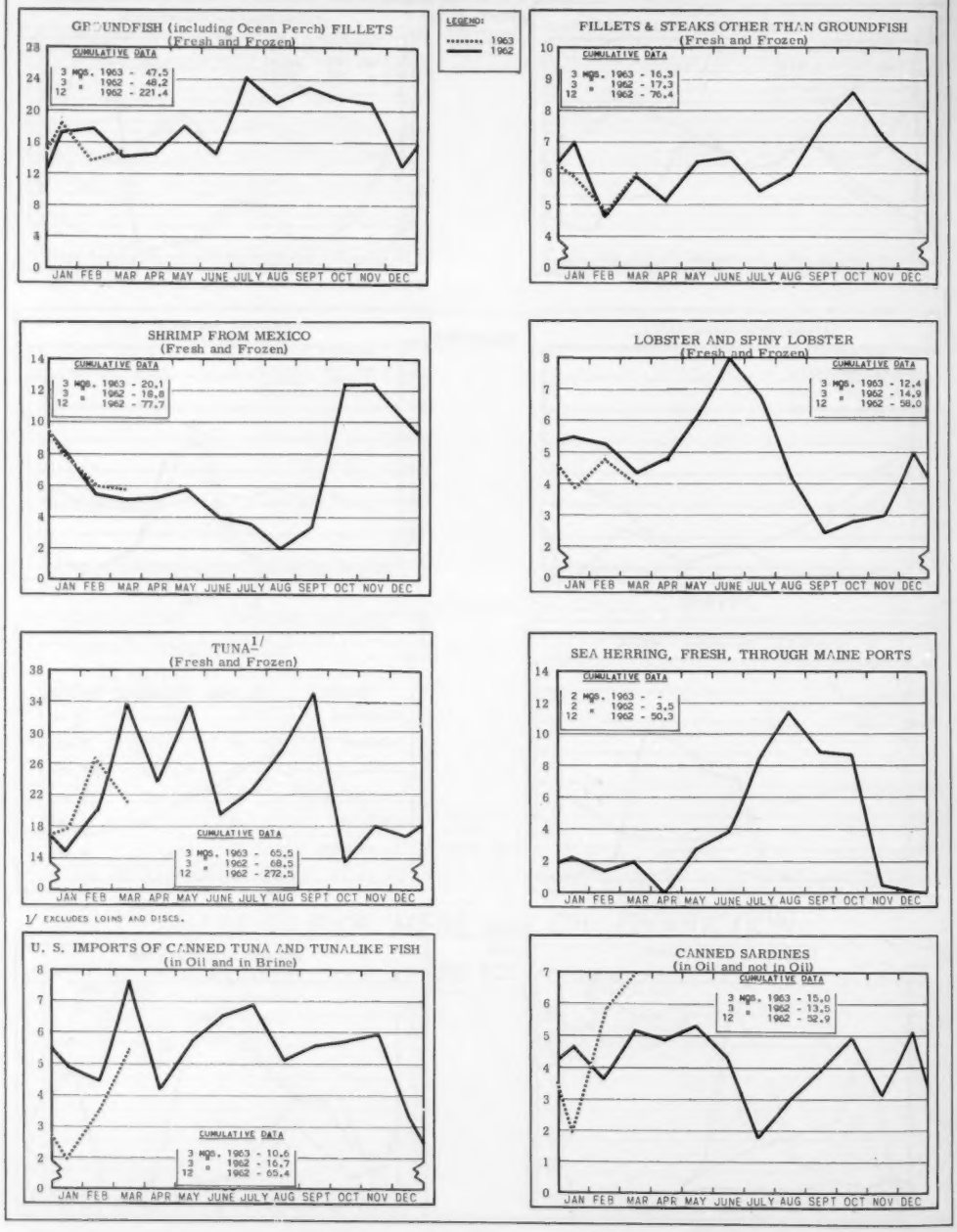




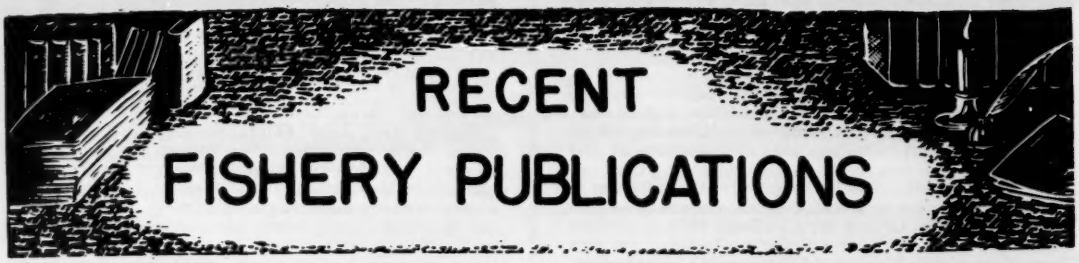
3/ SEASON TOTAL, AUG. 1, 1962-FEB. 28, 1963.
4/ SEASON TOTAL, AUG. 1, 1961-FEB. 28, 1962.

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds


GROUNDFISH (including Ocean Perch) FILLETS
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 47.5
3 " 1962 - 48.2
12 " 1962 - 221.4
LEGEND:
1963
1962
FILLETS & STEAKS OTHER THAN GROUNDFISH
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 16.3
3 " 1962 - 17.3
12 " 1962 - 76.4
SHRIMP FROM MEXICO
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 20.1
3 " 1962 - 16.8
12 " 1962 - 77.7
LOBSTER AND SPINY LOBSTER
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 12.4
3 " 1962 - 14.9
12 " 1962 - 58.0
TUNA 1/
(Fresh and Frozen)
CUMULATIVE DATA
3 MOS. 1963 - 65.5
3 " 1962 - 68.5
12 " 1962 - 272.5
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
2 MOS. 1963 - -
2 " 1962 - 3.5
12 " 1962 - 50.3
U. S. IMPORTS OF CANNED TUNA AND TUNALIKE FISH
(in Oil and in Brine)
CUMULATIVE DATA
3 MOS. 1963 - 10.6
3 " 1962 - 16.7
12 " 1962 - 65.4
CANNED SARDINES
(in Oil and not in Oil)
CUMULATIVE DATA
3 MOS. 1963 - 15.0
3 " 1962 - 13.5
12 " 1962 - 52.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ EXCLUDES LOINS AND DISCS.



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CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number — Title

CFS-3094 - Massachusetts Landings, August 1962, 5 pp.
CFS-3099 - Alabama Landings, November 1962, 3 pp.
CFS-3100 - Frozen Fishery Products, January 1963, 8 pp.
CFS-3105 - New Jersey Landings, December 1962, 4 pp.
CFS-3106 - New York Landings, December 1962, 4 pp.
CFS-3107 - California Landings, November 1962, 4 pp.
CFS-3111 - Michigan Landings, November 1962, 3 pp.
CFS-3112 - Ohio Landings, December 1962, 2 pp.
CFS-3113 - Wisconsin Landings, December 1962, 2 pp.
CFS-3115 - North Carolina Landings, December 1962, 4 pp.
CFS-3117 - Alabama Landings, December 1962, 3 pp.
CFS-3118 - Massachusetts Landings, September 1962, 5 pp.
CFS-3119 - Mississippi Landings, December 1962, 3 pp.
CFS-3120 - Rhode Island Landings, December 1962, 3 pp.
CFS-3121 - Massachusetts Landings, October 1962, 6 pp.
CFS-3122 - Pacific Coast Fisheries, 1961 Annual Summary, 10 pp.
CFS-3123 - Texas Landings, November 1962, 3 pp.
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FL-456 - White-Spot Disease of Fish Eggs and Fry, by Ken Wolf, 3 pp., August 1962 (Revised).

FL-541 - Aquatic Biology and Oceanography, A Selected List of Books, by Paul T. Macy and Ida K. Johnson, 10 pp., January 1963.

FL-543 - List of Special Scientific Reports and Special Scientific Report--Fisheries of the U. S. Fish and Wildlife Service, by Lola T. Dees, 38 pp., August 1962.

FL-544 - Report on the 1961 Transportation Research and Service Activities of the Bureau of Commercial Fisheries, by Carl P. Hoffman Jr. and Donald S. Fitz-Gibbon, 7 pp., June 1962.

FL-545 - List of Fishery Cooperatives in the United States, by Leslie D. McMullin, 19 pp., August 1962 (Revised).

FL-546 - Glossary of Terms used in Fur Seal Research and Management, 10 pp., February 1963.

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MNL-22 - Fisheries: Republic of South Africa and Territory of South West Africa, 1961, 27 pp.

Sep. No. 672 - Storage Life of Individually Frozen Pacific Oyster Meats, Glazed with Plain Water or with Solutions of Ascorbic Acid or Corn Syrup Solids.

Sep. No. 673 - Fluctuations in Maine Shrimp Landings.

Sep. No. 674 - Review of the 1962 Seasonal Movement of Albacore Tuna off the Pacific Coast of the United States.

SL-28 - Wholesale Dealers in Fishery Products, Michigan (Great Lakes Area), 1962, 3 pp. (Revised).

SSR-Fish. No. 407 - Waterflow through a Salmon Spawning Riffle in Southeastern Alaska, by William L. Sheridan, 25 pp., illus., March 1962.

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SSR-Fish. No. 423 - The Composition, Abundance, and Depth Distribution of the 1957 Summer Net Zooplankton of Bare Lake, Alaska, after Fertilization, by Robert F. Raleigh, 17 pp., illus., 1963.

SSR-Fish. No. 428 - An Evaluation of Fyke Trapping as a Means of Indexing Salmon Escapements in Turbid Streams, by Howard D. Tait, Jerry L. Hout, and Fredrik V. Thorsteinson, 21 pp., illus., June 1962.

SSR-Fish. No. 433 - The Preparation of Marine Phytoplankton for Microscopic Examination and Enumeration on Molecular Filters, by Robert W. Holmes, 9 pp., June 1962.

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SSR-Fish. No. 441 -The Bathykymograph, A Depth-Time Recorder, Frank J. Hester, Donald C. Aasted, and Robert W. Gilkey, 8 pp., illus., 1963.

Operations of the Bureau of Commercial Fisheries under the Saltonstall-Kennedy Act, Fiscal Year 1961, 100 pp., illus., processed. The seventh annual report to the Congress of the activities of the U.S. Bureau of Commercial Fisheries during the fiscal year ending June 30, 1961, under the provisions of the Saltonstall-Kennedy Act of July 1, 1954. This publication discusses commercial fishery progress by geographic areas including nationwide programs such as technological projects, economic studies, statistical programs, Market News services, and marketing programs. Among the important accomplishments during fiscal year 1961: (1) the Bond Award of the American Oil Chemists' Society was given a Bureau scientist and a contractor scientist for their outstanding co-authored publications on the development of thin-layer chromatography as adapted to fish oil research; (2) two Bureau films, "Salmon--Catch to Can," and "Sponge--Treasure from the Sea," received awards from the Edinburgh International Film Festival and the American Film Festival, respectively; (3) in New England, growth rates for sea scallops were established--they were found to enter the commercial fishery at 4 years of age; (4) it was concluded that storage of groundfish in refrigerated sea water offers promise in extending keeping quality and in reducing handling costs; (5) observations in the research program in Delaware Bay on oyster mortalities indicated a decrease in mortality among survivors of recent years, and their offspring, due possibly to resistance to MSX, (6) results of a 3-year study on striped bass in the Potomac River showed the population size ranged between 2 and 3 million pounds annually and the commercial fishery harvested about 40 percent of available fish; (7) collections of young menhaden in the Gulf of Mexico confirmed the theory that all major estuaries on both the Atlantic and Gulf coasts are nurseries for menhaden; (8) results of radiation studies on marine organisms showed that when fertilized fish eggs are irradiated at low levels, the number of developmental abnormalities increased; (9) in the Gulf of Mexico, observations proved that populations of the 3 major shrimp species produce 2 definable broods each year; (10) in the Great Lakes area, preliminary studies conducted on breaded chub fillets created interest in the commercial possibilities of this product; (11) the presence of 2 genetically distinct stocks of Pacific sardines within the area of the fishery was substantiated on the basis of blood type frequencies; (12) in the North Pacific Ocean, more than 11,000 salmon were tagged, of which nearly half were red salmon. Results of the study indicated that Bristol Bay red salmon are distributed throughout the Aleutian Island area; (13) it was found that the survival of eggs from pink salmon spawning in intertidal areas in Alaska may be very significant in determining the survival for each brood year; and (14) in Hawaii, results of a study on the use of gill nets for catching skipjack tuna showed a striking difference in the catches made with multifiber sections and with monofilament sections. Of a total of 324 shipjack caught, 319 were taken on the monofilament section and only 5 on the dyed multifiber sections.

Report of the Bureau of Commercial Fisheries for the Calendar Year 1958, 68 pp., printed, 1962. An account of the activities of the Bureau of Commercial Fisheries during 1958 together with a record of its administrative actions. The Bureau activities are aimed towards encouraging a strong, prosperous, and thriving commercial fishery industry based on well-utilized resources. To accomplish the objectives, programs of research, development, and services were carried out with increasing intensity during 1958. The report discusses the condition and trends of the fisheries, developments in the domestic fisheries, Federal legislation, and international developments. Principal accomplishments of the Bureau and new programs are also covered.

Report of the Bureau of Commercial Fisheries for the Calendar Year 1959, 81 pp., printed, 1962. The Bureau of Commercial Fisheries is responsible for carrying out the national fishery policy as outlined in the Fish and Wildlife Act of 1956: (1) to increase and maintain, for the people of the United States, a fishery resource capable of yielding the maximum annual product; (2) to strengthen and maintain a vigorous fishery industry by assuring full and fair access to its raw materials and to the American market; and (3) to do these things in partnership with the States and in full accordance with international obligations. Programs have been developed to effect this policy. Most of them involve biological, economic, and technological research. Others supply important services to the industry; such as promoting the consumption of fish, collection and publication of fishery statistics and market news, inspection of fishery products, vessel safety promotion, and many others. The report discusses the condition and trends of the fisheries, developments in the domestic fisheries, Federal legislation, and international developments. Principal accomplishments of the Bureau and new programs are also covered.

Report of the Bureau of Commercial Fisheries for the Calendar Year 1960, 75 pp., printed, 1962. During the calendar year 1960, the Bureau of Commercial Fisheries continued its efforts to provide the research and services that will assist the Nation to utilize fully and wisely its fishery resources. These efforts cover a wide spectrum of activities, from basic research in fields such as fishery biology or fish oil technology to such practical applications as school demonstrations of fish cookery or the dissemination of daily news of prices for fish landed in principal United States ports. The report touches briefly on phases of biological, economic, engineering, oceanographic, and technological research. It also discusses the many Bureau service programs, such as those involved in fishery products inspection, fishery market promotion, market news reporting, statistics collection, vessel loans, vessel safety promotion, and others.

The Sea, Conservation Note 10, 8 pp., illus., processed, December 1962. An educational leaflet covering oceanography, types of fish of commercial value, plant and animal resources of the sea, and the possibility of developing economical ways of converting salt water to fresh water.

Ten Years of Sport Fish Restoration--The Dingell-Johnson Program, 28 pp., illus., printed.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES BIOLOGICAL LABORATORY, BOX 3830, HONOLULU, HAWAII.

On the Comparative Efficiency of Production of Some Products of the Land and Sea, by S. V. Mikhailov, 12 pp., processed, October 1962. (Translated from the Russian, Okeanologiia, vol. 2, no. 3, 1962, pp. 385-392.)

On the Surface Zooplankton of the Indian Ocean, by N. M. Voronina, 20 pp., illus., processed, December 1962. (Translated from the Russian, Biological Investigations of the Sea-Plankton, Academy of Sciences of the USSR, Works of the Institute of Oceanology, vol. LVIII.)

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE ONLY FROM THE ICHTHYOLOGICAL LABORATORY, U. S. BUREAU OF COMMERCIAL FISHERIES, FISH AND WILDLIFE SERVICE, U. S. NATIONAL MUSEUM, WASHINGTON 25, D. C.

On the Numbers of Vertebrae and on a Few Other Osteological Characters of the Antarctic Fishes (by X-Ray), by Anatoly P. Andriashev, 7 pp., processed. (Translated from the Russian, Voprosy Ichthyologii, vol. 12, 1959.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary--Fishery Products, January 1963, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 103 S. Gay St., Baltimore 2, Md.) Receipts of fresh- and salt-water fish and shellfish at Baltimore by species and by states and provinces; total receipts by species and comparisons with previous periods; and wholesale prices for fresh fishery products on the Baltimore market; for the month indicated.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, February 1963, 14 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., Room 208, San Pedro, Calif.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, February 1963, 11 pp., illus. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, P. O. Box 6121, Pt. Loma Station, San Diego 6, Calif.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, February 1963, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, U. S. Customs House, 610 S. Canal St., Room 1014, Chicago 7, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the month indicated.

Farm Reservoir Fishes, FWS Circular 131, 12 pp., illus., printed, 1962. (U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Fish Farming Experimental Station, Stuttgart, Ark.) Production of fish in rotation with rice and other field crops is an expanding industry. Sport, food, and bait fishes are in production in the South Central United States. Some reservoirs are stocked with sport fish and angling is permitted on a fee basis. A variety of species is usually stocked into a reservoir to provide the best use of the food resources available. Other less desirable species occasionally find their way in and compete with the stocked fish for food and space. This brochure will help identify the fishes taken from a reservoir. The information given about each species should help in selection of the fish most suited for stocking in a particular reservoir. A few notes on water areas management are included.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, February 1963, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, Room 609, 600 South St., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; Gulf menhaden landings and production of meal, solubles, and oil; and sponge sales; for the month indicated.

New England Fisheries--Monthly Summary, February 1963, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial-fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by type of gear; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--December 1962 and January 1963, 19 and 14 pp. respectively. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, February 1963, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle 4,

Wash.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON 25, D. C.

"Development and Distribution of Larval and Juvenile Fishes of the Family Mullidae of the Western North Atlantic," by Melba C. Caldwell, Fishery Bulletin 213 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 62, pp. 403-457), 59 pp., illus., printed, 40 cents, 1962.

"Distribution of Tunas in Oceanic Waters of the Northwestern Atlantic," by James L. Squire, Jr., Fishery Bulletin 211 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 62, pp. 323-341), 23 pp., illus., printed, 20 cents, 1962.

"Gulf of Mexico Commercial Shrimp Populations--Trends and Characteristics, 1956-59," by Joseph H. Kutkuhn, Fishery Bulletin 212, (from Fishery Bulletin of the Fish and Wildlife Service, vol. 62, pp. 343-402), 64 pp., illus., printed, 40 cents, 1962.

"Introduction of the Threadfin Shad to Hawaii," by Thomas S. Hida and Donald A. Thomson, article, Progressive Fish Culturist, vol. 24, no. 4, 1962, pp. 159-163, processed, 25 cents.

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MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATIONS OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ABALONES:

"Abalones in British Columbia," by D. B. Quayle, article, Western Fisheries, vol. 64, July 1962, pp. 28-31, printed. Roy Wrigley Publications Ltd., 1104 Hornby St., Vancouver 1, B.C., Canada.

California Abalones, Family Haliotidae, by Keith W. Cox, Fish Bulletin No. 118, 132 pp., illus., printed, $1.15. Department of Fish and Game, Printing Division, Documents Section, Sacramento 14, Calif., 1962. Covers a 10-year study of abalones, describing the genus Haliotis and its geographical distribution. A section on the California abalones describes the anatomy of the Haliotis, its life history, enemies, parasites, and other problems. Also gives a history of the Indian, Mexican, and California abalone fisheries.

ALGAE:

Economic Marine Algae of Ceylon, IPFC Occasional Paper 61/4, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Maliwan Mansion, Phra Atit Rd., Bangkok, Thailand, 1961.

A Preliminary Bibliography of the Freshwater Algae of the Indo-Malesian Region (including N. Australia), IPFC Occasional Paper 61/2, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Maliwan Mansion, Phra Atit Rd., Bangkok, Thailand, 1961.

Research on the Marine Flora of the Pacific Area (Final Report January 1, 1960-August 31, 1962), by E. Yale Dawson, AD-287 736 Div. 16 (TISTB/SAT), 3 pp., printed, $1.10. Beaudette Foundation for Biological Research, Solvang, Calif., 1962. (For sale by Office of Technical Services, Washington 25, D. C.)

"Some Interesting Algae from Lake Huron," by Mason G. Fenwick, Contribution No. 4, 5 pp., illus., printed. (Reprinted from Transactions of the American Microscopical Society, vol. LXXXI, no. 1, January 1962, pp. 72-76.) The Great Lakes Research Division, Institute of Science and Technology, The University of Michigan, Ann Arbor, Mich.

AUSTRALIA:

Import Tariff System of Australia, OBR-62-43, 2 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This report presents information on units of currency, weight, and measure; bases of specific and ad valorem duties; method of payment of duty, preferential duties; taxes; consular documents and fees; trade restrictions; and other special regulations.

BASS:

Largemouth Bass, 7 pp., illus., printed. Louisiana Wild Life and Fisheries Commission, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans 16, La. Describes the appearance, habits, adaptability, and commercial value of the largemouth bass in Louisiana.

BEHAVIOR OF FISH:

"The Influence of Temperature on the Behaviour of Fish," by I. Hela and T. Laevastu, FAO Fisheries Biology Technical Paper No. 22, 23 pp., illus., processed, distribution restricted. (Reprinted from Archivum Societatis Zoologicae Botanicae Fennicae "Vanamo," vol. 15, nos. 1-2, 1961, pp. 83-103.) Fisheries Division, Biology Branch, Food and Agriculture Organization of the United Nations, Rome, Italy, September 1962.

"O Povedenii Ryby Pered Tralom Pro Vozdeistvii Na Nee Elektricheskogo Polya Peremennogo Toka i Medhanicheskogo Razdrazhitelya (The Effect of an AC Electrical Field and a Mechanical Irritant on the Behavior of Fish in Front of a Trawl)," by V. A. Shentyakov, article, Biological Abstracts, vol. 39, no. 2, 1962, Abstract No. 4674, printed in Russian.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

University of Pennsylvania 3815 Walnut St., Philadelphia 4, Pa.

BENELUX COUNTRIES:
Import Tariff System of Belgium, Netherlands, and Luxembourg, OBR-63-25, 4 pp., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C., February 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.) Presents information on customs tariff; units of currency, weight, and measures; bases of specific and ad valorem duties; sales and other internal taxes; consular documents and fees; import restrictions; and related subjects.

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"Biochemistry of Epidermal Layers and Slime of Fish" article, Torry Research Station, Annual Report 1960, pp. 35-36, printed. Torry Research Station, Aberdeen, Scotland, 1961.

"Biochemistry: Extractives of Fish Muscle," article, Torry Research Station, Annual Report 1960, pp. 34-35, printed. Torry Research Station, Aberdeen, Scotland, 1961.

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"Biochemistry: Fish Muscle Lipoproteins," article, Torry Research Station, Annual Report 1960, pp. 33-34, printed. Torry Research Station, Aberdeen Scotland, 1961.

"Biochemistry: Fish Muscle Proteins," article, Torry Research Station, Annual Report 1960, p. 32, printed. Torry Research Station, Aberdeen, Scotland, 1961.

BONITO:
"Los Bermeanos Pescan el Bonito a 1,500 Kilometros de Vigo," (The Men of Bermeo Fish for Bonito 1,500 Kilometers from Vigo), by Vicente Talon Ortiz, article, Puntal, vol. IX, no. 100, July 1962, p. 7, illus., printed in Spanish, single copy 12 ptas. (about 20 U.S. cents). Puntal, Apartado de Correos 316, Alicante, Spain.

BROOK TROUT:
"Transplantation of Brook Trout (Salvelinus fontinalis (Mitchill)) within a Small Stream System," by J. W. Saunders and M. W. Smith, article, Transactions of the American Fisheries Society, vol. 91, no. 4, 1962, pp. 388-394, printed. Secretary, American Fisheries Society, P.O. Box 483, McLean, Va.

BUFFALOFISH:
"Nutritive Value of Buffalo Fish," by Marinus C. Kik, article, Journal of the American Dietetic Association, vol. 41, August 1962, pp. 119-123, printed. American Dietetic Association, 620 N. Michigan Ave., Chicago 1, Ill.

BURMA:
Import Tariff System of Burma, OBR-62-36, 2 pp., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C., December 1962. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.) Presents information on units of currency, weight, and measures; bases of specific and ad valorem duties; method of payment of duty; sales and other internal taxes; shipping documents; trade restrictions; and other special regulations.

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CANADA:
British Columbia Catch Statistics, 1962 (By Area and Type of Gear), 174 pp., illus., processed. Department of Fisheries of Canada, 1110 W. Georgia St., Vancouver 5, B.C., Canada.

Fisheries Statistics, New Brunswick, 1961, 37 pp. illus., printed in French and English, 75 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, February 1963. Consists of tables giving the quantity and value of the principal species of fish and shellfish landed in New Brunswick, 1949-1961; quantity and value of manufactured fishery products, 1949-1961; quantity and value of landings by species and fisheries districts, 1960-1961; new capital investment in the commercial fisheries, 1961; classification of powered fishing craft by over-all length, 1961; number of persons engaged in primary operations by fisheries districts, 1960-1961; and persons engaged in the major fisheries, 1960-1961.

Fisheries Statistics, Nova Scotia, 1961, 47 pp., illus., printed in French and English, 75 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, February 1963. Consists of tables giving the quantity and value of the fish and shellfish landed in Nova Scotia, 1949-1961; quantity and value by species and fisheries districts, 1960-1961; number of persons engaged in the primary operations by fisheries districts, 1960-1961; and classification of powered fishing craft by over-all length and fisheries districts.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Import Tariff System of Canada, OBR-63-10, 4 pp., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington D. C., January 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Presents information on units of currency, weights, and measures; bases of duties; tariff rates; method of payment of duty; internal taxes; trade restrictions and special regulations; and related subjects.

National Fisheries Development (A Presentation to the Government of Canada by the Government of Newfoundland), 60 pp., printed. The Government of Newfoundland, St. John's, Newfoundland, Canada, February 1963. This report discusses the importance of the fishing industry to Canada and the need for a national governmental policy on fisheries. The recommended objectives are: (1) to create the environment of producer market organization and price stability essential for development; (2) to increase productivity; (3) to expand markets; (4) to initiate community development; and (5) to improve product quality.

32nd Annual Report, 1961, Department of Fisheries, 156 pp., illus., printed, 50 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1963. Presents the functions and activities of the Department of Fisheries for the year 1961, and the financial statements of the Department for the fiscal year 1961-1962. Covers in detail the activities of the Department's Conservation and Development Service, Protection Branch's patrol vessels, Inspection Service, Economics Service, Information and Consumer Service, and Industrial Development Service. Also covers the Fishermen's Indemnity Plan, and activities of the Fisheries Prices Support Board, Fisheries Research Board of Canada, international commissions, and special committees. Canada's Pacific and Atlantic Coast and lake fisheries are also discussed. Statistics cover the quantity and value of fish and shellfish landed, exports by type of product, number of fishermen in Canada, and value of vessels and gear. The appendix contains financial statements for fiscal year 1961-1962, and statements on fish-culture development.

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"Experiments on the Acute Toxic Effect of Modern Contact Insecticides on One-Year Carp (Cyprinus Carpio L.)," by D. Ludemann and H. Neumann, article, Water Pollution Abstracts, vol. 35, no. 4, 1962, abstract no. 789, printed. Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London EC4, England.

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"Zvuk I Svet Pomogayut Rybolovstvu" (Sound and Light Help to Catch Fish), by Yu. A. Shemanskii, article, Priroda, vol. 3, 1962, pp. 112-115, printed in Russian. Akademiya Nauk SSSR, M.Khariton'yevski per. 4, Moscow, U.S.S.R.

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Growth of Black Bullhead Catfish in Oklahoma, by Alfred Houser and Charles Collins, Report No. 79, 19 pp., illus., printed, Oklahoma Fishery Research Laboratory, Norman, Okla., February 1962.

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"Central American Common Market," by Nicolas Rivero, IV, article, Americas, vol. 15, no. 1, January 1963, pp. 3-6, illus., printed, single copy 35 cents. Sales and Promotion Division, Pan American Union, Washington 6, D. C.

CHESAPEAKE BAY:

Chesapeake Science, vol. 3, no. 3, September 1962, 80 pp., illus., printed, single copy 75 cents. Natural Resources Institute of the Universtiy of Maryland, Chesapeake Biological Laboratory, Solomons, Md. Contains, among others, the following articles: "Life History of the Yellow Perch, Perca flavescens, in Estuarine Waters of Severn River, a Tributary of Chesapeake Bay, Maryland," by Robert J. Muncy; "Sharks and Rays of Virginia's Seaside Bays," by R. Dickson Hoese; "Eggs, Larvae, and Young of the Hickory Shad, Alosa mediocris, with Comments on Its Ecology in the Estuary," by Romeo J. Mansueti; and "Sexual Dimorphism in Oyster Drills of Chincoteague Bay, Maryland-Virginia," by George W. Griffith and Michael Castagna.

COD:

"Otolity Treskovykh Ryb (Sem. Gadidae) Dal'evostochnykh Morei" (Otoliths of Fishes of the Cod Family (Gadidae) of the Far Eastern Seas)," by V. A. Skalkin, article, Voprosy Ikhtiologii, vol. 1, no. 2, 1961, pp. 286-289, printed in Russian. Akademia Nauk, U.S.S.R., Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.

"La pesca del Bacalao y su consumo en Espana" (The Fishery for Cod and Its Consumption in Spain), by Juan Antonio Cabezas, article, Industries Pesqueras, vol. XXXVI, No. 855, December 15, 1962, p. 426, printed in Spanish, single copy 10 ptas. (about 17 U.S. cents). Industrias Pesqueras, Policarpo Sanz, 21-2°, Vigo, Spain.

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Holodil'noe Konservirovanie Rybnyh Produktov (Cold Storage of Fish), by V. P. Zajcev, 430 pp., illus., printed in Russian, 1R. 53 k. (about US$1.70). Piscepromizdat, Moscow, U.S.S.R., 1962.

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COMMISSIONS:

(Atlantic States Marine Fisheries Commission) Minutes of the 21st Annual Meeting (September 26-28, 1962, Atlanta, Ga.), 251 pp., illus., processed, limited distribution. Atlantic States Marine Fisheries Commission, 336 E. College Ave., Tallahassee, Fla. Covers the minutes of the 21st annual meeting of the Commission with details of attendance; the first second, and third general sessions, and section meetings of the North Atlantic, Middle Atlantic, Chesapeake Bay, and South Atlantic Sections. Also includes accounts of the individual section meetings, resolutions recommended for adoption, and the executive committee meeting. Appendices include, among others, reports on research work accomplished by the Commission and its sponsoring agency, the U.S. Fish and Wildlife Service. Also included in the appendices are reports on problems of the Com-

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mon Market; progress in pesticide research; foreign fishing activities off the Atlantic Coast; shellfish cleansing; striped bass studies in New Jersey; technological problems of the blue-crab industry; and the radiation-preservation program at the Gloucester Technological Laboratory.

COMMUNICATIONS:
Federal Communications Commission--Rules and Regulations, vol. 4, February 1962, 399 pp., printed, $2. Federal Communications Commission, Washington, D. C., 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Contains all the rules for Part 7--Stations on Land in the Maritime Service; Part 8--Stations on Shipboard in the Maritime Services; and Part 14--Public Fixed Stations and Stations of the Maritime Services in Alaska. This edition is a revision of the September 1959 issue and includes all amendments adopted by the Commission through February 28, 1962.

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"Connecticut's Commercial Fisheries," by James P. Galligan, article, The Connecticut Wildlife Conservation Bulletin, vol. 9, no. 1, January-February 1963, pp. 1, 6-7, illus., printed. Connecticut State Board of Fisheries and Game, Hartford, Conn. A brief summary of the size and scope of the commercial fishing industry in Connecticut, and some of the factors responsible for a renewed interest in commercial fishing. Discusses the State's clam, oyster, scallop, and other shellfish industries; the lobster fishery; development of the shad industry; the menhaden fishery; and the dragger fleet.

"Distribution and Ecology of Fishes of the Mystic River Estuary, Connecticut," by William G. Pearcy and Sarah W. Richards, article, Ecology, vol. 43, no. 2, 1962, pp. 248-259, printed. Ecological Society of America, Duke University Press, Box 6697, College Station, Durham, N. C.

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Crabbing . . . and Crabs, by Ednard Waldo, 7 pp., illus., printed. Louisiana Wild Life and Fisheries Commission, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans 16, La. Contains specifications for the construction of the crab pot, and describes its increased use in Louisiana. Also covers briefly the life history and habits of the blue crab.

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Investigation of the Decomposition of Organic Matter in Natural Waters, by Heinrich R. Krause, FAO Fisheries Biology Report No. 34, 22 pp., illus., processed, distribution restricted. Fisheries Division, Biology Branch, Food and Agriculture Organization of the United Nations, Rome, Italy, June 1962.

DELAWARE:
The Largemouth Bass and the Chain Pickerel, 4 pp., illus., printed. Delaware Board of Game and Fish Commissioners, Dover, Del., July 1962. Describes the habits and growth of the largemouth bass and chain pickerel.

DENMARK:
Preparing Shipments to Denmark, OBR-63-30, 8 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., January 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Covers the preparation of shipping documents; information on labeling, marking, and packing; free ports and zones, customs procedures, and related subjects.

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"Distress Call of the Bottleneck Dolphin: Stimuli and Evoked Behavioral Responses," by John C. Lilly, article, Science, vol. 139, no. 3550, January 11, 1963, pp. 116-118, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington 5, D. C.

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The Fisheries of Egypt--A Report of a Survey with Recommendations for Future Development, by Philip R. Nelson and Charles F. Lee, 64 pp., processed. General Organization for Aquatic Resources, Ministry of Supply, United Arab Republic, Cairo, Egypt, June 1962. A comprehensive report on the present fishery resources of Egypt. Covers the fisheries of the Nile, the Delta lakes, artificial ponds, desert lakes, and the Mediterranean coast of Egypt. Also covers the principal species landed; type of vessels and gear used; facilities for fisheries development and research; and industrial aspects of the fisheries. Recommendations are made for training Egyptian biologists, employment of foreign consultants, and initiation of exploratory fishing studies.

ELECTRICAL FISHING:
"Tests et Indices D'efficacite des Appareils de Peche Electrique" (Tests and Indexes of the Efficiency of Electrical Fishing Apparatus), by R. Vibert, P. Lamarque, and R. Cuinat, article, Annales de la Station Centrale d'Hydrobiologie Appliquee, vol. 8, 1960, pp. 53-89, Annales de la Station Centrale d'Hydrobiologie Appliquee, Station d'Hydrobiologie Appliquee de Biarritz, Biarritz, France.

ETHIOPIA:
Establishing a Business in Ethiopia, OBR-62-42, 12 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses the law in Ethiopia proper and Eritrea; Government policy towards capital investment; extent of private foreign investment; and rights of aliens in Ethiopia and Eritrea. Also discusses entry and repatriation of capital; United States-Ethiopian Treaty; conditions and laws affecting employment; taxation in Ethiopia and Eritrea; and related subjects.

Report to the Imperial Ethiopian Government on a Reconnaissance Survey of Lake Abaya (Margherita), Ethiopia, 1960, by Dietmar R. Riedel, 34 pp., processed. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1961.

EXPORTS:
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D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Covers the preparation of shipping documents, information on labeling and marking; customs procedures, and related subjects.

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Preparing Shipments to Finland, OBR-63-2, 8 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington D. C., January 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office Washington 25, D. C.) Covers the preparation of shipping documents; information on labeling, marking, and packing; customs procedures; and related subjects.

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"Trawler-przetwornia 'B-15'," by W. Piltz, article, Budowinctwo Okretowe, vol. 5, no. 7, 1960, pp. 192-195, illus., printed in Polish. Wydawnictwa Czasopism Technicznych Not, 315 Czackiego, Warsaw, Poland.

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The Management of Tennessee Farm Ponds, by Eugene S. Cobb, 32 pp., illus., printed. Tennessee Game and Fish Commission, State Office Bldg., Knoxville, Tenn., 1961. Presents information on the basic factors involved in producing fish in farm ponds, so that a pond owner can establish a program of management which will develop and maintain a balanced population of fish capable of producing quality fishing in the years ahead.

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Handbook on Fish Culture in the Indo-Pacific Region, FB/T14, 213 pp., processed, distribution restricted. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, 1962.

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A Provisional List of Experts Concerned with Diseases of Aquatic Organisms and Associated Parasites, FB/T11 (Rev. 1), 28 pp., processed, distribution restricted. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, November 1962.

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"West European Fishery Conference," article, Svenska Vastkustfiskaren, vol. 32, no. 18, September 25, 1962, pp. 396-398, illus., printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Goteborg, Sweden.

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Light Fishing, by Raimondo Sara, GFCM Studies and Reviews No. 19, 45 pp., illus., processed. GFCM Secretariat, Food and Agriculture Organization of the United Nations, Rome, Italy, August 1962. This study attempts to assemble all the information available about the reactions of fish to light, and to study technical fisheries problems. It reports on findings concerning intensity of lights used in fishing, the effects of colored lights, and underwater lamps and electric generators. The appendix contains tables giving information on characteristics of sources of light and characteristics of boats and gear used in fishing with lights in the Mediterranean. Also includes several excellent photos and drawings.

"O Prichinakh Privlecheniya Ryb Na Svet (Why Light Attracts Fish)," by V. N. Belyaeva and I. V. Nikonovow, article, Voprosy Ikhtiologii, vol. 1, no. 3, pp. 513-518, printed. Akademia Nauk, U.S.S.R., Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.

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Fish Meal Supply and Price Trends, by Jack S. Ross, ERS-112, 12 pp., illus., processed. (Reprinted from Feed Situation, FdS-197, February 1963, pp. 27-37.) Economic Research Service, U. S. Department of Agriculture, Washington 25, D. C. Reports on supply, demand, prices, and trends in fish meal during recent years. According to the author "Domestic demand for fish meal has expanded rapidly in recent years. In the 1961-1962 feeding year, the total tonnage fed reached a record high of 615,000 tons, 50 percent more than 5 years ago. Even at this level, fish meal makes up only about 1.5 percent of the

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total tonnage of commercially prepared livestock and poultry feeds and about 4 percent of total high-protein feeds. However, its importance as an ingredient of poultry and hog rations is much greater than indicated by its relatively small volume. Fish meal is a primary source of certain amino acids (mainly lysine and methionine) and B-complex vitamins. These are not found in sufficient quantities in feed grains and many of the other byproducts." This report includes charts and tables giving data on fish meal supplies; production, imports, and supplies; production from menhaden; and other similar information. Most data are for 1952-1962, with some for earlier years.

Nutrient Composition of British Columbia Whole Herring Meal, by B. E. March, Jacob Biely, and H. L. A. Tarr, Circular No. 26, 11 pp., processed. Fisheries Research Board of Canada, Technological Station, Vancouver, B. C., Canada, September 1962.

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"Denaturation of the Actomyosin-Fraction in Fish Muscle Under the Influence of Salt Solutions," by R. R. Linko, article, Kylteknisk Tidskrift, vol. 21, no. 3, 1962, pp. 50-51, illus., printed in Swedish. Svenska Kyltekniska Forening, 86 St. Eriksgaten, Stockholm V, Sweden.

"Studies on the Physiological Chemistry of Phosphorus Compounds in Fish Muscle. VI--The Effects of Ammonium Chloride and Sodium Chloride in Water on Phosphorus Compounds in Fish Muscle," and "VIII--The Effect of Urethan on Phosphorus Compounds in Muscle of Mackerel," by Tomoo Nakano, articles, Bulletin of the Japanese Society of Scientific Fisheries, vol. 27, September 1961, pp. 850-854, and vol. 27, December 1961, pp. 1095-1099, printed. Japanese Society of Scientific Fisheries, 6-chome, Shiba-Kaigandori, Minato-Ku, Tokyo, Japan.

FISH OIL:

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Methods of Treating the Bottom of Fish Ponds and Their Effects on Productivity, by Alfred G. Wurtz, GFCM Studies and Reviews No. 11, 51 pp., printed. GFCM Secretariat, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1960.

FISH SCHOOLS:

"Otrazhatel'naya Sposobnost' Pelagicheskikh I Donnykh Ryb (Sound-Reflecting Capacity of Pelagic and Benthic Fish)," by E. V. Shishkova, article, Rybnoe Khoziaistvo, vol. 10, 1960, pp. 56-63, printed. VNIRO Glavniproekta, pri Gosplanie SSSR, Moscow, U.S.S.R.

FISH STOCKS:

Recent Model Concepts on the Dynamics of Demersal Fish Stocks, by Gotthilf Hempel and Dietrich Sahrhage, 45 pp., processed. (Translated from the German, Berichte Deutsche Wissenschaftliche Kommission fur Meeresforschung, vol. XVI, no. 2, pp. 51-89.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England, 1961.

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FLATWORMS:

Survival and Movements of the Flatworm, STYLOCHUS ELLIPTICUS, in Different Salinities and Temperatures, by Warren S. Landers and Richard C. Toner (U. S. Bureau of Commercial Fisheries, Biological Laboratory, Milford, Conn.), 8 pp., illus., printed. (Reprinted from Biological Bulletin, vol. 123, no. 1, August 1962, pp. 146-153.) The Marine Biological Laboratory, Woods Hole, Mass.

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Bathymetry of the Straits of Florida and the Bahama Islands, by Robert J. Hurley, Violet B. Siegler, and L. Kenneth Fink, Jr., Contribution No. 414, 9 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 12, no. 3, September 1962, pp. 313-321.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

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drography of the Mystic River; II--Distribution and Dynamics of Larvae; III--Distribution, Abundance, Growth, and Production of Juveniles; IV--Food Habits of Larvae and Juveniles," by William G. Pearcy, articles, vol. 18, article 1, 1962, pp. 5-78, printed. Peabody Museum of Natural History, Yale University, New Haven, Conn.

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Current Bibliography for Aquatic Sciences and Fisheries (Vols. 1 to 4 and 1957 Supplement, Subject Index--Physical Oceanography), 37 pp., processed, distribution restricted. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, November 1962. Contains detailed indexes to entries relating to the subject of physical oceanography.

English Translation of Convention Between the Governments of the U.S.S.R. and Japan on Deep Sea Fisheries in the Northwest Pacific (1956), FB/T27, 12 pp., processed, distribution limited. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy, October 1962.

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Using Storage in Food Service Establishments, by Robert F. Lukowski, Charles E. Eshbach, and Albert L. Wrisley, Jr., Food Management Program Leaflet No. 4, 24 pp., illus., printed. Cooperative Extension Service, University of Massachusetts, 408 Atlantic Ave., Room 303, Boston 10, Mass., 1962. This publication considers some aspects of the efficient use of storage facilities in a food service establishment. It is designed to call attention to major problem areas in the use of storage, and to suggest ways in which difficulties may be avoided or minimized. It discusses the storage care of various types of foods, including fresh and frozen fish.

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"Les Peches Lointaines, Objectif de Demain" (The Distant-Water Fisheries--Goal for the Future), by R. Lenier, article, France Peche, no. 70, February 1963, pp. 15-17, illus., printed in French. France Peche, Boite Postale 179, Lorient, France.

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"Engineering Aspects of Freeze-Drying Foods," by J. D. Mellor, articles, Refrigeration Journal, vol. 15, no. 10, April 1962, pp. 38-41; vol. 15, no. 11, May 1962, pp. 38-39, 42-43, illus., printed. John D. Jukes, Pty., Ltd., 165 Clarence St., Sydney, Australia. A brief review of progress in freeze-drying from 1909 to date is given, followed by an explanation of the principles involved. Part 2 of the article deals with the type of equipment being used in the process.

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"The Effect of Freezing in Fish Muscle," by R. M. Love, article, Recent Advances in Food Science, pp. 147-150, printed. University of Glasgow, Glasgow, Scotland, 1962.

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Frogs and Toads of Louisiana, by Perch Viosca, Jr., 7 pp., illus., printed. Louisiana Wild Life and Fisheries Commission, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans 16, La. Discusses briefly the twenty-five different kinds of toads and frogs found in Louisiana.

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General Agreement on Tariffs and Trade--Schedules of the United States of America, Department of State Publication 7451, 144 pp., processed, 70 cents. Department of State, Washington, D. C., November 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Contains schedules of the United States of America annotated to show countries with which concessions were negotiated at Geneva in 1960-1961.

GRAY SNAPPER:
Growth and Food of the Gray Snapper, LUTJANUS GRISEUS in Everglades National Park, by Robert A. Croker, Contribution No. 403, 5 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 91, no. 4, October 1962, pp. 379-383.) Institute of Marine Science, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

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East Greenland Fishing, Laboratory Leaflet No. 25, 3 pp., illus., processed. U. K. Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England, 1960.

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Basic Data on the Economy of Guatemala, OBR-62-35, 24 pp., illus., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses, among other items related to the economy of Guatemala, the fishing industry which is underdeveloped although there are opportunities for profitable development of both offshore and freshwater fisheries.

Import Tariff System of Guatemala, OBR-62-37, 4 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Presents information on units of currency, weights, and measures; bases of specific and ad valorem duties; method of payment of duty; preferential and differential duties; consular fees and documents; trade restrictions; and other special regulations.

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"Development of Volatile Carbonyls in Haddock (Melanogrammus aeglefinus) Flesh During Storage at 2° C.," by Joseph M. Mendelsohn and Maynard A. Steinberg, article, Food Technology, vol. 16, June 1962, pp. 113-115, printed. The Garrard Press, 510 North Hickory, Champaign, Ill.

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"The Toxic Effect of Pentachlorophenate, a Herbicide, on Fishery Organisms in Coastal Waters. I--The Effect on Certain Fishes and a Shrimp," by Tetuo Tomiyama and Katsumi Kawabe, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 28, no. 3, 1962, pp. 379-382, printed. Japanese Society of Scientific Fisheries, 6-chome, Shiba-Kaigandori, Minato-Ku, Tokyo, Japan.

HERMIT CRABS:

The Larval Development of the Tropical Land Hermit COENOBITA CLYPEATUS (Herbst) in the Laboratory, by Anthony J. Provenzano, Jr., Contribution No. 392, 21 pp., illus., printed. (Reprinted from Crustaceana, vol. 4, part 3, 1962, pp. 207-228.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

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"Plane Spots Herring Spawnings," by D. N. Outram, article, Trade News, vol. 15, no. 4, October 1962, pp. 3-5, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. An aerial survey of herring spawning grounds along the rugged west coast of the Queen Charlotte Islands was undertaken in early April 1962. The purpose of the survey was twofold: (1) to evaluate aerial reconnaissance as a method of reporting herring spawning in remote areas; and (2) to obtain some indication of the size of the west coast spawning stocks.

Studies on the Stock of Pomeranian Bay Spawning Spring Herring in 1950-1954, by Wlodzimierz Fesolowicz, OTS 60-21283, 24 pp., illus., processed, 50 cents. (Translated from the Polish, Prace Morskiego Instytutu Rybackiego w Gdyni, no. 9, 1957, pp. 151-173.) Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 1962.

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India: A Growing Market for U. S. Products and Investment, OBR-63-26, 28 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., January 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A report presenting information on India as a growing market for U. S. products and investment. It discusses India's foreign trade during 1951-1961, reflecting the economic growth under the five-year plans; and trade with the United States. Also covers import policy and foreign aid as factors in trade; the third five-year plan, 1961-1966; and outlook for foreign investment.

Investment Factors in India, OBR-62-40, 28 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A question and answer type of report on investment factors in India. Presents information on the scope and growth rate of private foreign investment and licensing in India; fields for investment; operating facilities in India; and related subjects.

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Licensing and Exchange Controls of Indonesia, OBR-62-34, 8 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses the import and export controls of Indonesia, and United States import and export controls.

INTERNATIONAL COMMISSIONS:

(International North Pacific Fisheries Commission) Chairman of Canadian Section Outlines Reasons for Decisions and Recommendations of Commissioners, by G. R. Clark, article, Trade News, vol. 15, no. 7, January 1963, pp. 7-10, processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

(International North Pacific Fisheries Commission) Proceedings of the Ninth Annual Meeting, 1962, 204 pp., illus., processed. International North Pacific Fisheries Commission, 6640 NW., Marine Dr., Vancouver 8, B. C., Canada.

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"World Trade in Fish," by Georg Borgstrom, article, Fishing News International, vol. 2, no. 1, January-March 1963, pp. 17-21, illus., printed, single copy 6s., 6d (about 91 U. S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England.

IRAN:

Investment Factors in Iran, by George S. Ayers, OBR-63-15, 8 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., January 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Presents information on prospects for U. S. private investment in Iran. Government controls over industry, screening of investment proposals, taxation, and financial facilities.

IRELAND:

Import Tariff System of Ireland, OBR-62-38, 2 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Presents information on units of currency, weights, and measures; bases of specific and ad valorem duties; method of payment of duty, preferential duties; trade restrictions; and other special regulations.

Report to the Government of Ireland on the Development of the Sea Fishery Industries, by I. S. McArthur, 82 pp., illus., processed. Fisheries Division, Food and Agriculture Organization of the

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United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1959.

IRISH MOSS:

"The Irish Moss Industry in the Maritimes," by M. C. Cormier, article, Trade News, vol. 15, no. 7, January 1963, pp. 3-6, illus., processed. Information and Consumer Research, Department of Fisheries, Ottawa, Canada. Irish moss (Chondrus crispus) is a small perennial seaweed growing attached to rocks near low water or beyond it, to depths of 20 feet or more. Its habitat in Europe includes Norway, the British Isles, France, and Spain. In the northwestern Atlantic, it occurs from New Jersey to Newfoundland. It is harvested with rakes, dried, and the extract (gelose of carrageen), because of its viscosity and suspension power, is used in the dairy, packing, brewing, and textile industries.

IRRADIATION:

To Determine the Effect of Irradiation upon the Wholesomeness of Food, by Om P. Malhotra and others, Progress Report No. 13, 17 pp., printed. Illinois University, College of Veterinary Medicine, Urbana, Ill., March 1962.

Long-Term Rabbit and Hamster Feeding of Irradiated and Control Foods and Its Effect upon the Blood Serum Constituents (Phase I) and Nutritive Value of Irradiated Proteins and Control Proteins (Phase 2), by D. F. Watson, R. M. Smibert, and R. W. Engel, Progress Report No. 10, 14 pp., printed. Virginia Agricultural Experiment Station, Blacksburg, Va., February 28, 1962.

On the Nutritive Value of the Major Nutrients of Irradiated Foods and Appraisal of the Toxicity of Irradiated Foods, by P. B. Rama Rao and others, Progress Report No. 21, 30 pp., illus., printed. University of Illinois, Urbana, Ill., March 1, 1962.

ISRAEL:

Fishermen's Bulletin, vol. 4, no. 3-4 (33-34), September-December 1962, 44 pp., illus., printed in Hebrew with English abstracts. Department of Fisheries, P. O. B. 699, Haifa, Israel. Includes, among others, the following articles: "On the Fisheries of Israel," by M. Shavit; "Fisheries Resources of the Red Sea," by A. Ben-Tuvia; "Fisheries Investigations of the Israel South Red Sea Expedition. Part II--Additional Fishes," by A. Ben-Tuvia; "Fishing in Ancient Egypt," by M. Nun; "Ancient Fishing Gear in Ein-Gev," by Z. Ben-Ami; "Plinius on Fishes," by M. Sas; "'Tonara' in Eilat," by S. Levin; "Fishing with Lights during the Year 1962," by A. Ben-Tuvia; and "Summary of the 1962 Light Fishing Season," by Y. Ariav.

ITALY:

"Refrigerating Plants in the Italian Ocean Fishing Fleet," by O. Osti, article, Il Freddo, vol. 16, no. 2, March-April 1962, pp. 1-12, illus., printed in Italian. Associazione Frigorifera Italiana, 8 Via Donatello, Milan, Italy.

JAPAN:

Journal of the Faculty of Fisheries and Animal Husbandry, vol. 4, nos. 1-2, illus., printed. The Faculty of Fisheries and Animal Husbandry, Hiroshima University, Fukuyama, Japan, December 1962. Contains, among others, the following articles: "Electrical Shocking Effect on Larvae of Balanus;" "Comparison of Catches of Two Pound Nets Located at Different Distances from the Shore;" "Ecology of Fishes of Kasaoka Bay as Observed from the Catch of Pound Nets;" and "Reports on the Biology of the 'Umitaka-Maru' Expedition. Part 2--Planktonic Gastropoda Collected by the Training Vessel 'Umitaka-Maru' from the Pacific and Indian Oceans in the Course of Her Antarctic Expedition, 1956."

KENYA:

"The Relationship Between Tilapia nigra (Gunther) and T. mossambica (Peters) in the Eastern Rivers of Kenya," by P. J. P. Whitehead, article, Proceedings of the Zoological Society of London, vol. 138, part 4, 1962, pp. 605-637, printed. Ministry of Forest Development, Game and Fisheries, Nairobi, Kenya.

KOREA:

Korean Fisheries, 1962, 132 pp., illus., printed. Marine Resources Section, Fisheries Bureau, Ministry of Agriculture and Forestry, Seoul, Korea, Ocotber 1962. With the indroduction of advanced fishery techniques during the first decades of this century, great progress was made in developing the industry in Korea. In 1937, Korea's fish catch amounted to more than 10 percent of the global total. However, the subsequent diminution of marine resources in the coastal waters and the outbreak of World II, then the Korean Conflict, dealt a crippling blow to Korea's fisheries. At present, vigorous effort is being made to rehabilitate the Korean fisheries industry and deep-sea fishing is being undertaken for the first time. The Government is promoting the fisheries within the framework of its Five-Year Plan for Economic Development. This report gives a brief description of the current situation in Korea's fisheries industry in the fields of fishing, processing of fisheries products, and fish culture. It also presents on outline of plans for future development of the industry. Also includes brief descriptions of the composition and functions of various fisheries organizations, particularly cooperatives, financing institutions, and administrative agencies; research, inspection, and educational organizations; together with a summary of foreign assistance and aid to fisheries. The appendix presents statistical data on fisheries production, vessels, important species landed, exports, processed products, and other related topics.

Preliminary List of Inshore Diatoms of the Southern Coast of Korea, IPFC Occasional Paper 61/11, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Maliwan Mansion, Phra Atit Rd., Bangkok, Thailand, 1961.

LEBANON:

Establishing a Business in Lebanon, OBR-62-41, 8 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., December 1962. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses the Lebanese Government's policy on investment; entry and repatriation of capital; foreign ownership of property; and

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regulations affecting employment; taxation; and related subjects.

LOUISIANA:
(Louisiana Wild Life and Fisheries Commission) Ninth Biennial Report, 1960-1961, 213 pp., illus., printed. Louisiana Wild Life and Fisheries Commission, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans 16, La. The report of the Louisiana Wild Life and Fisheries Commission during the calendar years ending December 31, 1960, and December 31, 1961, includes chapters on the Fish and Game Division and Division of the Oysters, Water Bottoms, and Seafood. The section on fisheries discusses fish hatcheries, pond and lake projects, work done under the Dingell-Johnson Project, and other topics. Also discusses research in shrimp production, clam shell planting to aid oyster reproduction, operation of seed-oyster reservations, a crawfish report, and marine biological reports. Also includes a chapter on work of the Water Pollution Control Division.

MALAGASY REPUBLIC:
"L'Avenir de la Peche Malgache" (The Future of the Malagasy Fishery), by Michel Angot, article, La Peche Maritime, vol. 42, no. 1018, January 1963, pp. 22-25, illus., printed in French, single copy 11F (about US$2.23). La Peche Maritime, 190 Boulevard Haussmann, Paris, France.

MANATEE:
Manatee and the Control of Water Hyacinth in the Near East, by T. J. Job, processed. (Reprinted from FAO in the Near East.) Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1961.

MARICULTURE:
Shellfish Mariculture, by R. W. Menzel, Contribution No. 173, 4 pp., printed. (Reprinted from Proceedings of the Gulf and Caribbean Fisheries Institute, Fourteenth Annual Session, November 1961, pp. 195-199.) Oceanographic Institute, Florida State University, Tallahassee, Fla. In summary the author pointed out that "The increasing need for food, the development of techniques for rearing of several of the commercial mollusks including oysters and the quahaug clam, the possibilities of pond culture and other techniques of controlled sea farming, the serious inroads in shellfish production caused by diseases, predators and other factors have caused an increasing interest in scientific mariculture. Laboratory rearing of the mollusks will result in a constant supply of seed. Techniques have been developed for the chemical control of predators and only await adequate application. Chemical and genetical control of diseases and the production of faster growing strains of mollusks are now being explored. Technology has advanced so that the sea foods can be harvested and processed more efficiently. Additional research in many problems is needed. Needed are pilot operations to determine if the laboratory developed techniques are applicable to mariculture. Needed are the development and testing of disease and predator control, production of more vigorous and faster growing "crops," and crops that will reach market size uniformly to allow machine harvesting. There are many other facets that need to be explored and perfected in order that mariculture can compete with agriculture in the mass production of food."

MARINE ANIMALS:
Hydrophone Installation for the Study of Soniferous Marine Animals, by John C. Steinberg, Morton Kronengold, and William C. Cummings, Contribution No. 377, 6 pp., illus., printed. (Reprinted from The Journal of the Acoustical Society of America, vol. 34, no. 8, August 1962, pp. 1090-1095.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

MARINE BACTERIA:
"Marine Bacteria with Antiyeast Activity," by John D. Buck, Samuel P. Meyers, and Katherine M. Kamp, article, Science, vol. 138, no. 3547, December 21, 1962, pp. 1339-1340, printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington 5, D. C.

MARINE BIOLOGY:
Preparation of Synopses on the Biology of Species of Living Aquatic Organisms, H. Rosa, Jr., FB/SI, processed. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1962.

MARINE MAMMALS:
"Locomotion in Pinnipeds," by Carleton Ray, article, Natural History, vol. LXXII, no. 3, March 1963, pp. 11-21, illus., printed, single copy 50 cents. The American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y.

MARINE RESEARCH:
List of Marine Institutions in the Tropics (30° N. to 30° S.), FAO Fisheries Biology Technical Paper No. 20, 11 pp., illus., processed, distribution restricted. Fisheries Division, Biology Branch, Food and Agriculture Organization of the United Nations, Rome, Italy, June 1962.

MARKETING:
"Seafood Distribution Methods Studied by USDI to Improve Frozen Handling," article, Quick Frozen Foods, vol. XXV, no. 4, November 1962, pp. 93-94, illus., printed. E. W. Williams Publications, Inc., 1776 Broadway, New York 19, N. Y. Discusses studies being conducted on methods of handling frozen fishery products during distribution, and the factors affecting the ultimate quality of the product.

MAURITANIA REPUBLIC:
Basic Data on the Economy of the Islamic Republic of Mauritania, by William E. Hutt, OBR-63-6, 16 pp., illus., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington D. C., January 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses among other items related to the economy of Mauritania, the fishing activity which is carried out on the Senegal River and in the territorial and international waters along the Mauritanian coastline.

MIDWATER TRAWLS:
"A New Method for 'Aimed' One-Boat Trawling in Midwater and on the Bottom," by J. A. Scharfe,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

GFCM Studies and Reviews No. 13, 38 pp., illus., processed. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1960.

MOLLUSKS:
Marine Molluscan Genera of Western North America: An Illustrated Key, by A. Myra Keen and Eugene Coan, 126 pp., illus., printed, $4.50. Stanford University Press, Stanford University, Calif., 1963.

NETHERLANDS NEW GUINEA:
Report of a Preliminary Survey of the Ajamaroe Lakes, Netherlands New Guinea, IPFC Occasional Paper 61/12, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Maliwan Mansion, Phra Atit Rd., Bangkok, Thailand, 1961.

NETS:
Ring Nets Made of Synthetic Fibres, by Gerhard Klust, GFCM Studies and Reviews No. 4, 18 pp., illus., printed. The GFCM Secretariat, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1958.

NEW ZEALAND:
"Fish Exported from New Zealand During the 1961 Calendar Year," table, Commercial Fishing, vol. 1, no. 2, October 1962, pp. 16-17, printed. Trade Publications Ltd., 47 Lewis Eady Bldg., 192 Queen St., Auckland, New Zealand.

"N. Z. Should Seek 12-Mile Fisheries Limit," by W. A. Fox, article, Commercial Fishing, vol. 1, no. 2, October 1962, p. 5, illus., printed. Trade Publications Ltd., 47 Lewis Eady Bldg., 192 Queen St., Auckland, New Zealand.

NORTHWEST ATLANTIC:
"International Co-Operation in Northwest Atlantic Research," by C. E. Lucas and A. J. Lee, article, Fishing News International, vol. 2, no. 1, January-March 1963, pp. 32-34, illus., printed, single copy 6s., 6d. (about 91 U.S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England.

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Metabolism and Nutrition, Radiation and Sterilization of Foods, 33 pp., printed. University of California, School of Medicine, Los Angeles, Calif., January 31, 1962.

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"The Influence of Fermentation of the Nutritive Value of Fish with Special Reference to Fermented Fish Products of Southeast Asia," by K. Amano, article, FAO International Conference on Fish in Nutrition (Washington, D. C., September 19-27, 1961), Paper No. R/II.5/3, processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1961.

PAKISTAN:
Report on the Work of East Regional Laboratories, P.C.S.I.R., Dacca, 1959-1961, 57 pp., illus., printed. Pakistan Council of Scientific and Industrial Research, Mirpur Rd., Dhanmandi, Dacca-2, Pakistan. Reports on the work of the laboratories at Dacca during 1959-1961, including studies of hilsa-fish oil, puti-fish oil, fish spoilage, and sun-dried fish.

PHILIPPINES:
Fisheries Statistics of the Philippines, 1961, 90 pp., processed. Bureau of Fisheries, Department of Agriculture and Natural Resources, Quezon City, Philippines, 1962. A complete report covering all aspects of Philippine fishery production during 1961, with some comparative data for previous years. The tables are grouped together under the headings (1) production, consumption, and requirement; (2) commercial fishing vessels; (3) fish ponds; (4) foreign trade; and (5) other data. Subdivision of the tables is made according to gear, species caught, monthly production, and fishing grounds. The appendices include, among other items, information on the fishery districts, fishing grounds used by commercial vessels, and forms used in collecting statistics. Except for the table showing production data since 1949, most of the information covers the five-year period 1957-1961.

PHYTOPLANKTON:
Growth of Pure Cultures of Marine Phytoplankton in the Presence of Toxicants, by Ravenna Ukeless (Biological Laboratory, U.S. Bureau of Commercial Fisheries, Milford, Conn.), 6 pp., printed. (Reprinted from Applied Microbiology, vol. 10, no. 6, November 1962, pp. 532-537.) Applied Microbiology, Williams & Wilkins, Mt. Royal and Guilford Aves., Baltimore 2, Md.

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The Effects of Current Eddies on the Distribution of Plaice Eggs, by T. Laevastu, FAO Fisheries Biology Technical Paper No. 21, 13 pp., illus., processed, distribution restricted. Fisheries Division, Biology Branch, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, June 1962.

POISONOUS FISH:
"Aiguillon Venimeux de Certains Poissons: Ictalurus nebulosus, Ictalurus catus. Recherches sur l'Envenimation des Plaies" (Venomous stinger of Certian Fish: Ictalurus nebulosus, Ictalurus catus. Studies of Infected Wounds) by A. R. Potvin, article, Biological Abstracts, vol. 39, no. 2, 1962, Abstract No. 6294, printed in French. University of Pennsylvania, 38-5 Walnut St., Philadelphia 4, Pa.

RADIATION:
Effects of Visible Radiation on Salmonoid Embryos and Larvae, by Ronald Eisler, Contribution No. 138, 66 pp., illus., printed. (Reprinted from Growth, vol. 25, 1961, pp. 281-346.) College of Fisheries, University of Washington, Seattle 5, Wash.

Radiation and Sterilization Foods (Progress Report for Period Ending March 15, 1962), by M. A. Ross, F. M. Garner, and W. E. Tucker, Jr., AD-287 016 Div. 16 (TISTB/CCH), 3 pp., printed, $1.10. Armed Forces Institution of Pathology, Army Medical Center, Washington, D. C., 1962. (For sale by the Office of Technical Services, Washington 25, D. C.)

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RADIOACTIVITY:
"Studies on Nuclear Species in Contaminated Fish and Their Movement in the Body of the Fish," by S. Saheki, R. Yasumoto, and K. Mori, article, Water Pollution Abstracts, vol. 35, no. 3, 1962, Abstract No. 570, printed. Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London EC4, England.

RED TIDE:
"Photo-Autotropy in Gymnodinium breve Davis," by David V. Aldrich, article, Science, vol. 137, no. 3534, 1962, pp. 988-990, printed. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington 5, D. C.

SALMON
Salmon Spawning Report--British Columbia, 1961, 16 pp., processed. Department of Fisheries, Pacific Area, 1155 Robson St. W., Vancouver 5, B. C., Canada, February 26, 1963. A report covering the seeding of the salmon spawning areas of British Columbia for 1961. Developments or trends of the 1961 migration and spawning escapement of salmon, by species and areas, are discussed.

Forecast of Bristol Bay Red Salmon Run in 1963, Informational Leaflet No. 23, 22 pp., illus., processed. Commercial Fisheries Division, Alaska Department of Fish and Game, Juneau, Alaska, January 17, 1963. The highest estimate of red salmon return into Bristol Bay rivers in 1963 is 24.6 million fish. The forecast was prepared jointly by the Alaska Department of Fish and Game, the U. S. Bureau of Commercial Fisheries, and the Fisheries Research Institute of the University of Washington. The methods of forecast include cycle analysis, smolt and return relationship, early returns of certain year groups, and abundance of immature salmon at sea. The report includes forecasts of the run by rivers and lakes and from high seas operations such as purse-seining and gill-netting. Contains a number of statistical tables presenting data on these topics.

SEA TROUT:
Estimation of Abundance and Mortality of a Spotted Seatrout Population, by E. S. Iversen and Alan W. Moffett, Contribution No. 405, 4 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 91, no. 4, October 1962, pp. 395-398.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Florida.

SHRIMP:
Observations on the Taxonomy and Biology of Some Indo-West-Pacific Penaeidae (Crustacea, Decapoda), by D. N. F. Hall, Colonial Office Fishery Publications No. 17, 236 pp., illus., printed, £4 12s. (US$18.40--includes mailing costs). Sales Section, British Information Services, 845 Third Ave., New York 22, N. Y., 1962. Deals with the Penaeid shrimp, many of which have a wide distribution in the seas about Malaya. Shrimp are one of the most valuable products of tropical fisheries and in many countries are the basis for export industries which bring in valuable foreign exchange. Besides offshore collections of shrimp made during the cruises of the research vessel Manihine, the author deals with the catches made in coastal waters by the smaller research launches, and by the various local fishing gears, including the great fixed stake-nets. Particularly interesting is the author's account of the commercial shrimp ponds of Singapore, the growth and feeding of the shrimp during their stay in the ponds, and the reasons for the ponds' high productivity. He also discusses possible unexploited resources of shrimp in the Malayan region.

SPAIN:
Publicaciones Tecnicas de la Junta de Estudios de Pesca (Technical Publications of the Fishery Research Committee), Publication No. 2, 247 pp., illus., printed in Spanish. Direccion General de Pesca Maritima, Subsecretaria de la Marina Mercante, Madrid, Spain, January 1963.

SPINY LOBSTER:
The Rock Lobster of South West Africa--Size Frequency, Reproduction, Distribution, and Availability, by J. P. Matthews, Investigational Report No. 7, 59 pp., illus., printed. Marine Research Laboratory, Administration of South West Africa, Windhoek, South West Africa, 1962. Deals with the South West African spiny lobster Jasus lalandii (Milne Edwards) and discusses the size distribution, sexual development, and availability during the period 1959 to 1961. The introduction gives an historical review of legislative development of the industry and research, as well as a summary of knowledge regarding reproduction and metamorphosis of the rock or spiny lobster.

STRIPED BASS:
Striped Bass in Maryland Tidewater, by Romeo J. Mansueti and Edgar H. Hollis, 23 pp., illus., processed. Maryland Department of Tidewater Fisheries, Annapolis, Md., February 1963. Summarizes in nontechnical terms the results of research and management studies of the striped bass in Maryland tidewater. "The striped bass, with the scientific name Roccus saxatilis (Walbaum) and the common name 'rock,' is the most important and valuable fish found in Maryland waters. The fish on the Great Seal of Maryland is said to be the rock, symbolic of Chesapeake Bay," according to the authors. The report discusses in considerable detail the biology of the striped bass, its local movements and migrations, its utilization by anglers and netters, and its conservation and management. The authors state that future research and management activities will be focused on continual monitoring of the rock fishery and the habitat; population size estimation of legal-size fish to learn how many individuals are present at the beginning of a fishing season; and forecasting fish crops for all fishermen.

THAWING:
"Dielectric Thawing of Fish. II--Experiments with Frozen White Fish," by A. C. Jason and H. R. Sanders, article, Food Technology, vol. 16, June 1962, pp. 107-112, printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

TILAPIA:
"The Culture of Tilapia nigra (Gunther) in Ponds. VIII--The Effect of Cropping a Breeding Population by Trapping," by Vernon D. Van Someren, article, East African Agricultural and Forestry Journal, 1962,

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pp. 176-185, printed. East African Agricultural and Forestry Journal, Box 21, Kikuyu, Kenya.

U.S.S.R.:
The Progress of the Fishery on the Northern Slope of Goose Bank in Relation to the Hydrological Conditions, by A. A. Elizarov, 9 pp., processed. (Translated from the Russian, Trudy PINRO, vol. XI, 1959, pp. 142-148.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England, 1962.

VIETNAM:
Present Status of Research and Development in Connection with the Chanos Fisheries in Viet-Nam, IPFC Occasional Paper 61/9, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Maliwan Mansion, Phra Atit Rd., Bangkok, Thailand, 1961.

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A Survey of Salt-Water Sport Fishing in Virginia, 1955-1960, by C. E. Richards, Contribution No. 123, 13 pp., illus., printed. (Reprinted from Chesapeake Science, vol. 3, no. 4, December 1962, pp. 223-235.) The Virginia Institutue of Marine Science, Gloucester Point, Va.

WATER POLLUTION:
"A Review of the Literature of 1960 on Wastewater and Water Pollution," by H. Heukelekian, article Journal of Water Pollution Control Federation, vol. 33, no. 7, 1961, pp. 681-710, printed. Water Pollution Control Federation, 4435 Wisconsin Ave. NW., Washington 16, D. C.

WHALE OIL:
"The Paper Chromatography of Fats. XLVI--The Composition of Sperm-Whale Oil. The Isolation and Characterization of Palmitoleic Acid, by H. P. Kaufmann and Z. E. Shoeb (Deut. Inst. Fettforschung, Munster, Germany), article, Chemical Abstracts, vol. 55, November 13, 1961, 24055b, printed. The American Chemical Society, 1155 16th St. NW., Washington 6, D.C.

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"Locomotion in Whales," by P. E. Purves, article, Nature, vol. 197, no. 4865, January 26, 1963, pp. 334-337, illus., printed. Nature, St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

WHALING:
"25.8 Million Tons of Whales in 16 Years," article, Fisheries Newsletter, vol. 22, no. 2, February 1963, p. 26, printed. Commonwealth Fisheries Office, Department of Primary Industry, Canberra, Australia. According to the author, "In 16 years of post-war pelagic whaling in the Antatctic, 519,413 whales, with a total weight of 25,809,404 metric tons, were killed by the combined national fleets. The total comprised 451,987 baleen whales (23,632,104 tons) and 67,426 sperm whales (2,177,300 tons)." Includes a table showing numbers and tonnage of whales taken by Antarctic pelagic expeditions, 1946/1947-1961/1962.

WHITE SEA:
Biology of White Sea, USSR, OTS No. 62-11771, 19 pp., illus., printed, 50 cents. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., September 21, 1962.

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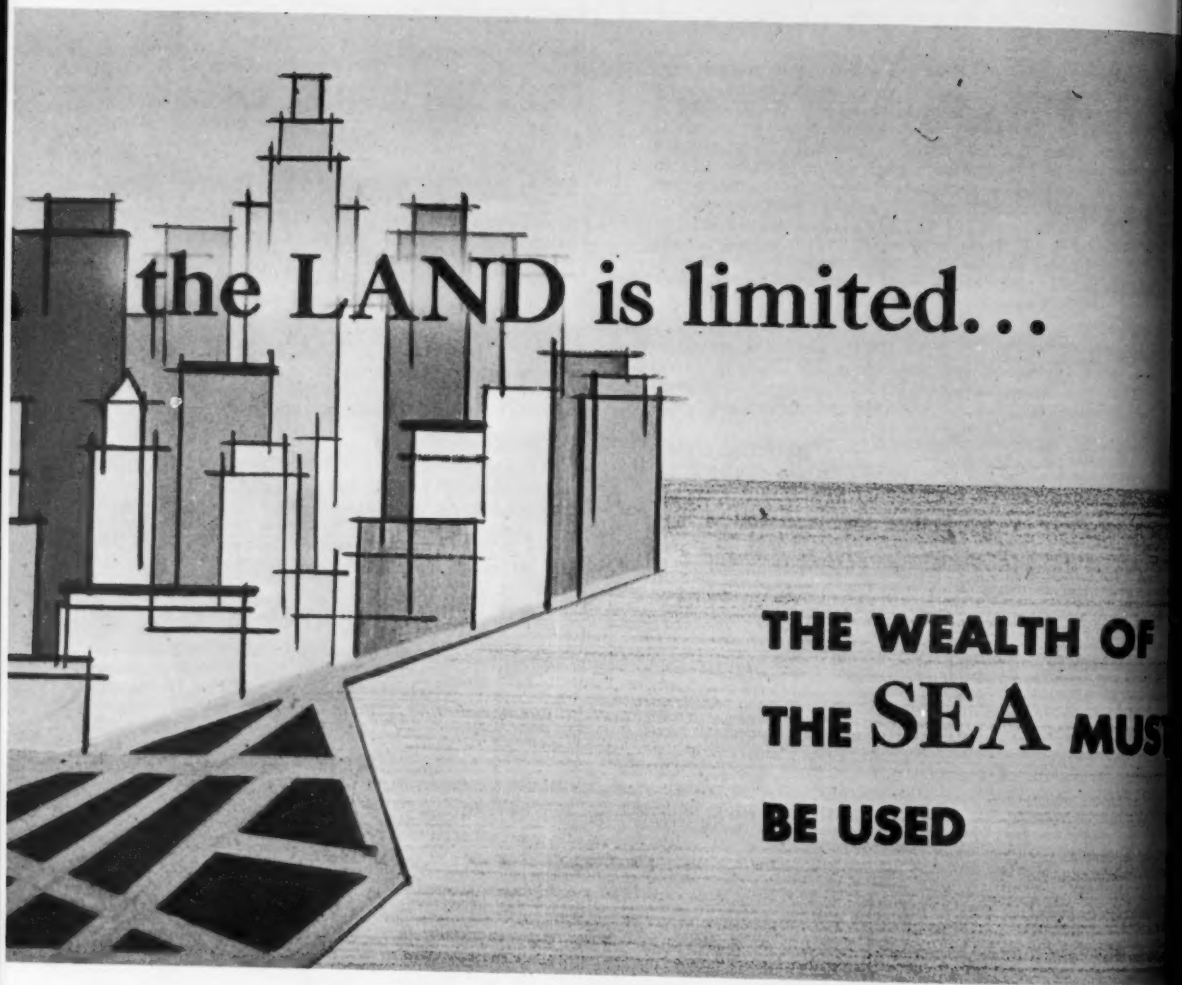
"The Changing Global Fisheries," by G. L. Kesteven, article, Fishing News International, vol. 2, no. 1, January-March 1963, pp. 9-13, illus., printed, single copy 6s. 6d. (about 91 U. S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England.

YELLOW PIKE:
"An Analysis of an Alternate-Year Walleye Fry Stocking Program in the Cedar River in Iowa," by R. E. Cleary, article, Proceedings of the Iowa Academy of Science, vol. 68, 1962, pp. 254-259, printed. Iowa Conservation Commission, Biology Station, Independence, Iowa.

Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.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